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DESIGNS ON THE PREHISTORIC POTTERY OF ARIZONA

By
ELEANOR P. CLARKE



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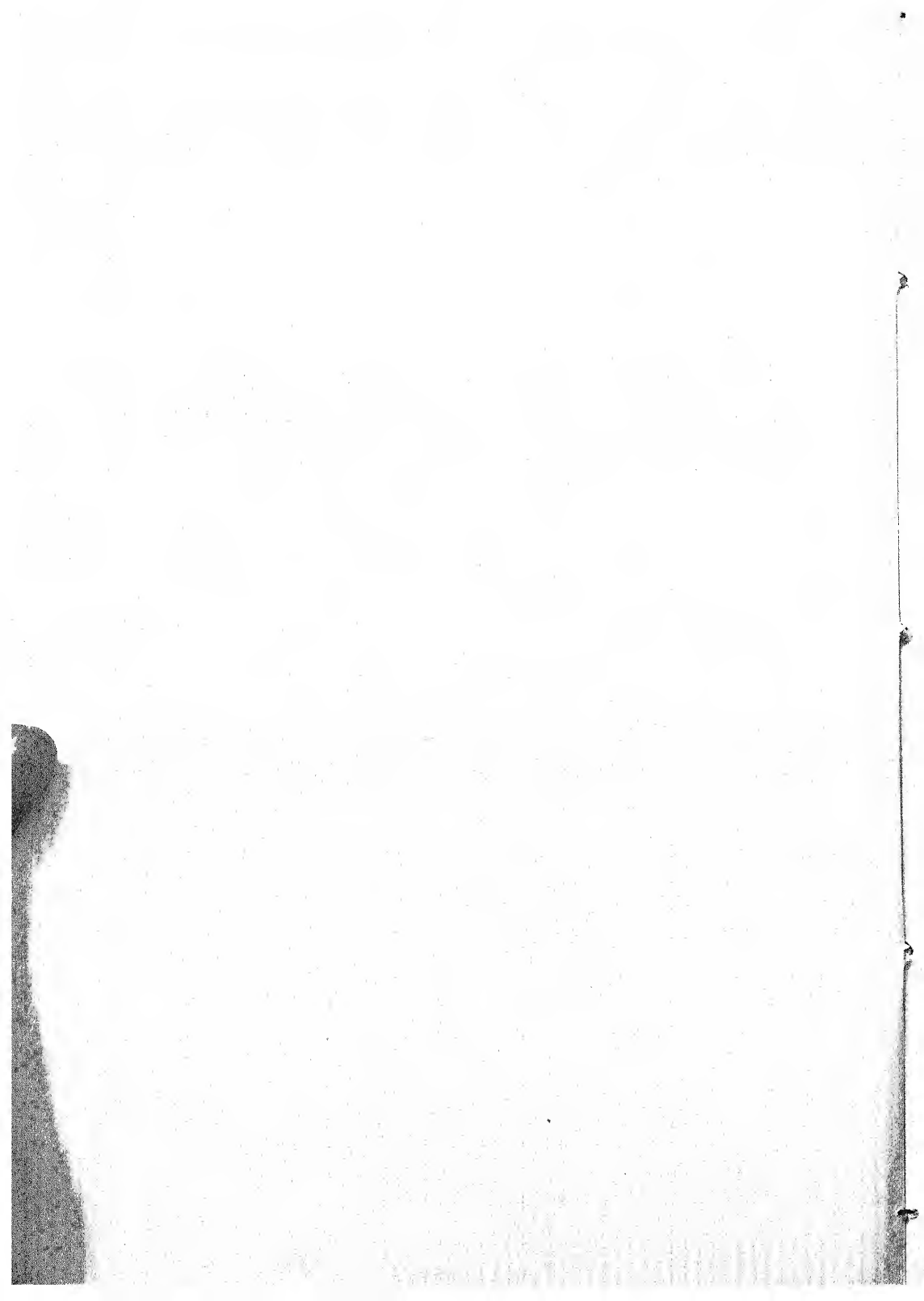
PREFACE

This paper is an attempt to understand the development of pottery among the ancient Arizonans; to trace, if possible, to their beginnings the various patterns on bowls and ollas; to analyze the different elements of which these designs are composed; and to seek in their similarities and their differences indications of migrations and cultural contacts.

This study was accepted as a thesis in partial fulfillment of the requirements of the Master of Arts degree in Archaeology at the University of Arizona, 1933.

ACKNOWLEDGEMENT

I wish to express my great appreciation of the kindly guidance and helpful suggestions of Dr. Byron Cummings, head of the Department of Archaeology of the University of Arizona, to whom I am deeply indebted. I would like to thank also the faculty and students of the department for their cordial interest and cooperation.



DESIGNS ON THE PREHISTORIC POTTERY OF ARIZONA

INTRODUCTION

For years American archaeologists, busy with the many phases of civilization in the Old World, did not realize that here in their own country was a cultural development of the greatest interest and importance, comparable indeed to the achievements of Neolithic man anywhere in the world. Amazingly high levels were reached in the architecture of the Mayas, and also in their astronomical observations. Beautiful jewelry of gold, shell, and precious stones was made in many parts of the New World. Excellent work in pottery, worthy to be compared with the Hellenic, the Mycenaean, and the ancient Egyptian, was produced in the central section from Peru to the Southwest. In a much larger area, practically all over the American Indian area, baskets were made, equal in beauty to those made anywhere in the world; while in Peru textiles were woven which rival the famous Coptic fabrics in the beauty of their complicated patterns and in their wide range of color.

With such a wealth of material at hand it is difficult not to wander from a chosen field of investigation, that of the pottery of one relatively small area only, the State of Arizona. A study of the technique of the making of pottery, of the many varied shapes of the pots, and, above all, of the painted decoration found on such a large number of them may be of some use in the attempt to determine the origin of at least this one trait of the people of the Southwest (and of Arizona in particular). The tracing of these patterns from the earliest times should show the continuity of their development, if any such continuity existed; it should also give an indication of migrations, diffusions, and of trade relations among the various tribes.

THE SOUTHWESTERN AREA

GEOLOGY AND CLIMATE

The prehistoric Indian inhabitants of this Southwestern area stand out as one of the great cultural groups in the Americas. They have left a record of their occupation for us to read, not only in their spectacular cliff houses, but also in the great variety of beautiful pottery vessels for which we have to dig into the less imposing mounds where villages of other types once stood.

In modern geographical terms this Southwestern area includes practically the whole of the states of Arizona and New Mexico, the greater part of Utah, the southwestern corner of Colorado, an undetermined area in eastern Nevada, the Texan triangle south of New Mexico, and the northern parts of the Mexican states of Sonora and Chihuahua. All of this region is a "high and arid plateau, sloping away to the south and west from the Rocky mountains,"¹ which brief description gives no idea of the varied beauty of the scenery nor of the great range of the climate from the cool, pine clad mountains, to the hot, dry, cactus covered desert.

Geologically this area is of great general interest. A careful survey of Arizona has been made by the Bureau of Mines² for the use of those interested in this phase of the history of Arizona. For the archaeologist, however, there are other deposits of greater interest. Such are the clay beds which are found all over the State in sufficient numbers so that each village had a supply near by. This clay varies from the fine white clay (kaolin) to the coarsest kind of clay which can be used for pottery. Much of it is colored with iron oxide, giving a yellow to orange tinge in some localities, and a deep, rich red in others. Impurities of various kinds give shades of brown and gray as well as a pinkish buff. Some of the clays contain sand or bits of glittering mica, whereas others have to have a tempering material added. Some of the clay is soft and can be scooped up in the hands,

¹Roberts, F. H. H., Jr., *Shabik'eschee Village*, p. 2, 1929.

²Darton, N. H., *A Resume of Arizona Geology*, 1925.

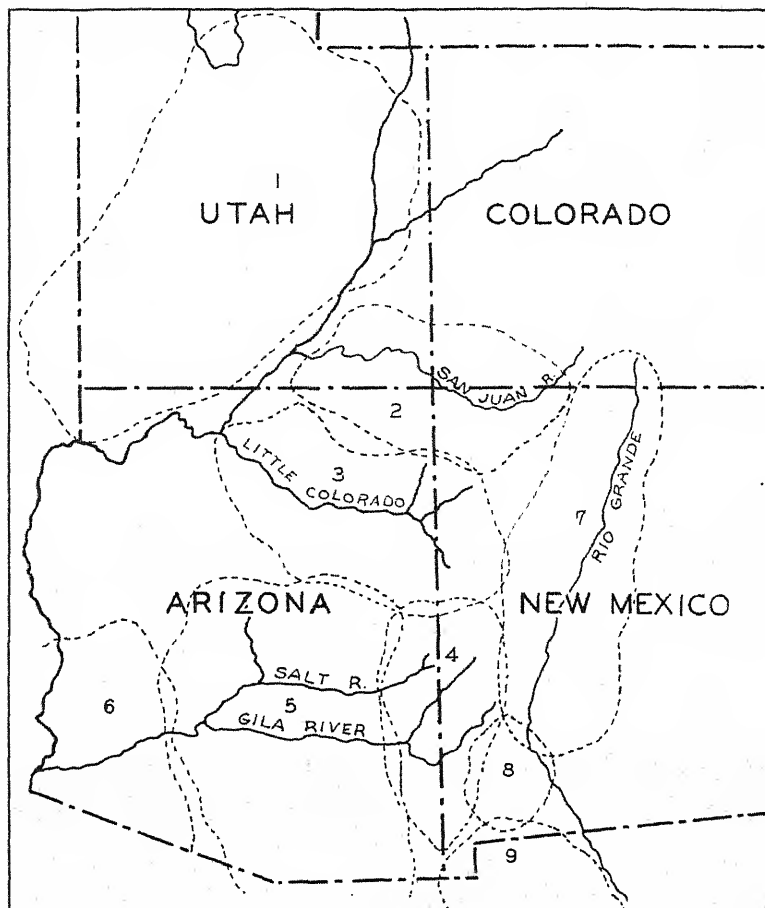


Figure 1.—Map of the Southwest, showing cultural areas:

- | | |
|------------------------|---------------|
| 1. Northern Peripheral | 6. Lower Gila |
| 2. San Juan | 7. Rio Grande |
| 3. Little Colorado | 8. Mimbres |
| 4. Upper Gila | 9. Chihuahuan |
| 5. Middle Gila | |

but a large proportion of it has solidified into shale which has to be pounded to a powder before it can be used.³ Some kind of common clay was present everywhere in more or less

³Guthe, Carl E., *Pueblo Pottery Making*, 1925.

large quantities, but the pure white kaolin and the red, yellow, and black sometimes had to be sought far afield. Hematite and limonite were pounded to a powder and used as paint, as was also manganese, though the bee weed was frequently used in the preparation of black paint, and the smudged interiors were produced in the firing, as were also the black firing clouds. The geology of the country thus influenced to a considerable extent the color and quality of the pottery of the different districts.

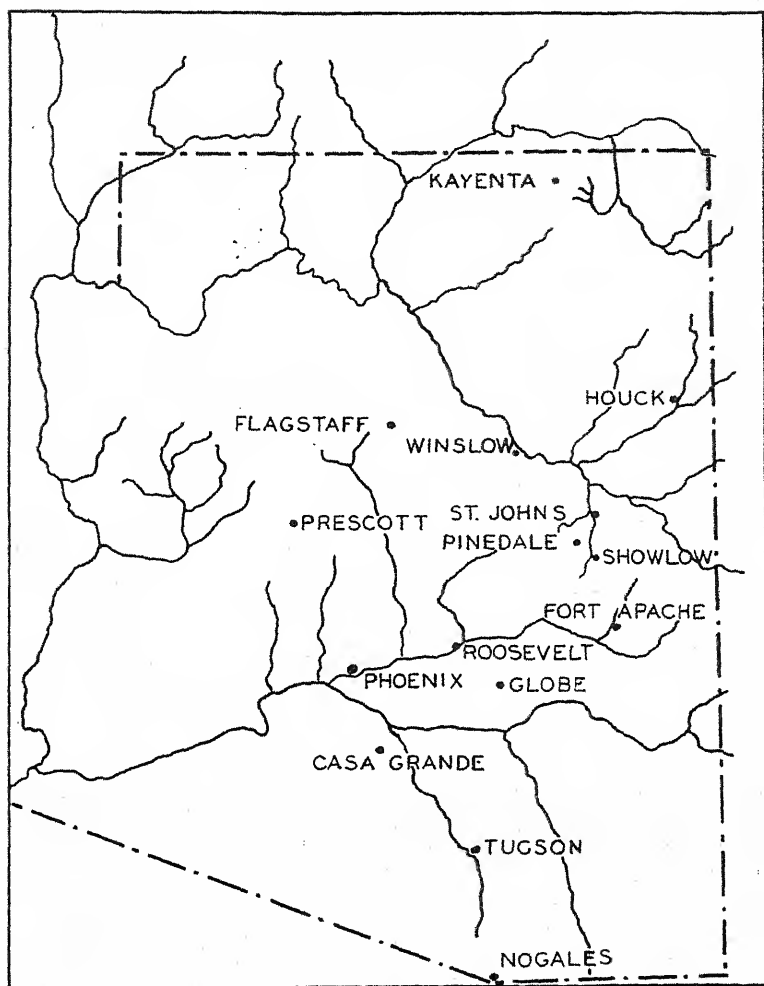
The climatic changes seem to have been relatively slight since man has been living here, particularly since he has been building houses. There are, however, some indications that there was more moisture in former times and that the rivers contained more water. Some of the ancient villages are in situations far removed from any stream or spring, which suggests that the ancient source of supply has either dried up or taken another course. Other villages had just the opposite difficulty; some ruins gave evidence of having been flooded, and to have remained under water for a considerable time. There is also another indication of some such change; the ancient irrigation ditches are now high above the water line at the point where they take off from the river.⁴ Given enough water (and a very small quantity seems to be all the skillful Indian dry farmer needs) the soil of the area is sufficiently fertile to produce fair crops.

Game was never particularly abundant anywhere in the region, which would in part account for the scanty remains of the few early nomadic hunters. In the mountains were "deer, bear, rabbit, wild turkey, grouse, and quail, with an occasional mountain lion or wildcat."⁵ Rabbits, turkeys, and a number of other birds were common in Arizona, and mountain sheep were hunted to some extent.

Thus geologic and climatic conditions were such that a small nomadic population could be supported and a somewhat larger agricultural one. Living conditions were far from easy, but they were not cruelly hard. They were

⁴Cummings, Byron, *Ancient Canals of the Casa Grande*, pp. 9-11, 1926.

⁵Roberts, F. H. H., Jr., *Shabik'eschee Village*, p. 2, 1929.



Modified from map by Arizona Bureau of Mines.

Figure 2.—Map of State of Arizona.

such as to stimulate man to continuous effort, in fact, just the conditions under which culture and civilization grow and flourish.

This prehistoric agricultural population naturally concentrated in the river drainages of which there are four in the region; the San Juan in the north, the Little Colorado

to the south of it, the Gila-Salt in the south central part of Arizona, and the Rio Grande in New Mexico. These agricultural Indians were not, however, the first comers into the area.

THE EARLIEST POPULATION

Just who the very first inhabitants of America were is still an undecided question. It has been an accepted theory for a long time that man came to this continent from Asia rather recently by way of Bering Strait, that is, recently geologically speaking. Shetrone says, "It is now generally concluded that the progenitors of the American race came from Asia, probably by Bering Strait, subsequent to the most recent glacial invasion, 8,000 or 12,000 years ago."⁶ The American Indian is more like the original Mongoloid than either Mongolians or Malaysians. His culture was in the hunter-fisher stage with a knowledge of kindling fire, of shaping stone, and of chipping flint. He possessed as weapons the harpoon, the spear, and the bow and arrow. Kidder's opinion is slightly different. "This continent was peopled many thousands of years ago by the ancestors of the American Indian. When they arrived in America they were in a state of savagery little above that of, say, the later paleolithic men of Europe."⁷

This opinion of the relatively recent arrival of man has been somewhat shaken recently by finds which suggest that man was here in Pleistocene times, long before the passage across Bering Strait was open for the passage of Paleolithic or even of Neolithic man. In Sulphur Spring valley in Arizona, remains of a mammoth were found in close proximity to hearths and eoliths of a most primitive kind. A short distance away in Cienega Wash human bones were found in a similar Pleistocene stratum. In Gypsum Cave in Nevada an atlatl point was found in the layer below that in which were found the remains of a ground sloth.⁸ At about

⁶H. C. Shetrone, *The Mound Builders*, p. 481.

⁷A. V. Kidder, *The Trend of Archaeological Research*, p. 223.

⁸Stock, Chester, *Problem of Antiquity Presented by Gypsum Cave, Nevada*, 1931.

the same time human bones were found in Ecuador associated with those of a mastodon. Though these finds may prove that a Pleistocene man existed in the Americas some twenty or thirty thousand years ago, it might also prove that the sloth and the mammoth lived on after the glaciers receded, perhaps up to within fifteen or even ten thousand years of our own time.⁹ In spite of Hrdlicka's opinion that "there is not a single American human bone in existence or on record, the geological antiquity of which can be demonstrated beyond doubt,"¹⁰ there is a growing conviction of the possibility of the existence of human beings on the American continents in Pleistocene times. Our prehuman ancestors may have wandered to this continent before they had articulate speech in that early time when the lower arctic region had a less rigorous climate. The geological conditions of the Ice age isolated this early man in the Americas for a long period of time during which he multiplied, prospered, and developed in much the same way as did his Old World brethren. "The early American did not differ greatly from the early Asiatic, the early Egyptian, or even the primitive European."¹¹

CENTERS OF ANCIENT POPULATIONS IN AMERICA

It is thus possible that long before any Neolithic Mongoloids could have crossed to our shores by way of Bering Strait, there were some primitive dolicocephalic nomads wandering about. These people seem to have known fire and to have hunted both large and small game with primitive stone weapons. They may even have started on the upward path toward civilization before any stimulus came to them from outside. These indigenous Americans must have wandered southward during the Ice age seeking that part of the country where living conditions were most favorable. And it is in some such favored spot that it seems reasonable to look for the starting point of man's evolution.

⁹Harrington, M. R., *The Mystery of Gypsum Cave*, 1930, p. 34.

¹⁰Hrdlicka, Ales, *The Origin and Antiquity of the American Indian*, 1923, pp. 481-494.

¹¹Cummings, Byron, *The Ruins of Cuicuilco*, 1923, p. 219.

in the Americas. Mexico and Central America seem to have been pleasant and habitable even in Pleistocene times; therefore, as is to be expected, it is here that the earliest traces of a dense population are to be found. There was perhaps a second center in Peru. At least it is in these two localities that the native American Indian culture reached its highest stage of development. This culture grew up on the basis of the cultivation of corn, which may be descended from teocentli, a grass found in a wild state in Mexico.¹² This is the reason given by one school of botanists for assuming that Mexico is the central point from which culture spread. Another school thinks that Peru may be the center because here are found the largest number of different varieties of corn. The theory that the valley of Mexico was the center of the ancient American Indian world seems the more reasonable one in the light of other discoveries. Here in this valley has been found what is probably the oldest building in our New World, the Temple of Cuicuilco. This ancient place of worship had not only been built and used once, but had been twice rebuilt, and then abandoned, before our era. At about the time of Christ, or even earlier (geologists disagree as to the date), the Pedregal lava flow surrounded the base of the structure, which at that time had been abandoned long enough for a considerable thickness of soil to have accumulated over it. Here and in the ancient cemetery at Copilco, buried under the same lava flow, have been found the earliest pottery and figurines of the archaic horizon. These are far from primitive and suggest a long period of development. In the lowest layer the pottery was well polished though perhaps not quite so well made nor so highly polished as in the second period, where the pieces are decorated with a shadow pattern in black on red, or in red on brown. Casuelas and bowls were the common shapes. The dark pottery of the third period is, in contrast, crude and heavy. Its decoration consists of moulded ornaments and of incised lines. The casuela is again the most common shape, though bowls, cups, and a few ollas have been found.

¹²Morley, S. J., *Unearthing America's Ancient History*, 1931, pp. 99-126.

The changes in the type of ware found in the three strata of this horizon seem to indicate some changes in the population; perhaps a shifting of tribes as volcanic eruptions made their homes too hot for occupation, perhaps wars between different groups. That these people wandered a long way in search of new homes is suggested by the fact that the culture of corn is spread far and wide. It may have reached first the Mayan peoples on the coast where conditions were so favorable for agriculture that life became less strenuous and man had leisure to develop other cultural traits. The imperative need of knowing when to plant corn led to the necessity of an accurate system for measuring time. For this purpose astronomy, the calendar, and writing were developed by these Mayans. The earliest recorded date so far found is on the Tuxtla statuette, 98 B.C. At Uaxactun is the earliest deciphered record on stone, 68 A.D. Architecture and all other arts and crafts progressed with amazing rapidity. Among these was of course pottery, which attained as high a level of excellence as did any of the other arts. Their beautiful, highly polished, and elaborately decorated ware is of interest to this discussion mainly on account of a remarkable resemblance to Hopi pottery in some of the symbols used. The feathered serpent, another symbol common in the art of Mexico and Central America, is also found in the Southwest, even as far north as Utah, where it is represented on a pictograph in a cave in Nine Mile canyon, Green river.

MIGRATIONS AND DIFFUSIONS FROM MEXICO

This problem of migrations and diffusions from Mexico must be considered, since there is without doubt a connection of some sort between the cultures of Arizona and the older and more advanced culture of Mexico. This possibility of contact seems to exist even from archaic times. The Mexican tribes who were driven from their homes by the Pedregal lava flow had to seek new homes somewhere. It is conceivable that some few groups may have been pushed farther and farther north by hostile tribes already in possession of the land through which they slowly moved on.

After a long period of wandering, stragglers may have penetrated as far north as the San Juan region, bringing with them a few precious seeds of corn and the memory of the making of pottery. Here they must have mingled with the few nomads who hunted the region, settled down, and planted their first crops. It is possible that it was not long before they began to experiment with the making of pottery. Their crude and clumsy first results would indicate that all knowledge of the technique had been lost en route. The improvements which soon took place suggest a far off influence from archaic Mexico, most easily discernable in the pottery patterns where the interlocked scroll appears in early pottery even as far north as the San Juan region. Later other infiltrations from Mexico are suggested by the appearance of other motives. Before this time of course influences on pottery patterns had come in from the north and west where basket making had grown into a flourishing industry long before the first steps in pottery making were taken. These earlier cave people of Arizona (basket makers) were dolicocephalic, as were apparently the first comers from the south. Later came a wave of invaders of brachycephalic type. These people introduced some cultural changes, such as the bow and arrow, and the baby board, which is so hard that it flattens the skull of the child occipitally. These newcomers did not interrupt the development of pottery, which suggests a peaceful penetration rather than a conquest. They may even have given new impetus to the ceramic industry by bringing in much needed knowledge and skill.

EARLY COMERS FROM AFAR

Though our American Indian is remarkably homogeneous in type, there are sufficient differences among the groups to arouse speculation. Though classed as a Mongoloid there is no doubt that he is a racial mixture, showing also some Caucasoid and some Negroid characteristics. Though there does seem to be some outside influence on the type, there is apparently very little on the culture. The Mongoloid could get into the Americas more easily than any

other race, coming across Bering Strait from Asia; and there seems to be no doubt that he did come across this way in late Paleolithic or in early Neolithic times. Thus the long series of discoveries of America began. For ten or twelve thousand years these Mongoloids have been wandering back and forth from America to Asia. Some of them certainly must have wandered south and been absorbed into the native population. It was not until comparatively recent times, however, that a larger wave or drift of Mongoloids came in. These were the Athapascans whom nobody seemed to want. They settled more or less in the west central part of Canada, from whence they sent raiding parties to the south which, as Navajos and later, Apaches, menaced until recently the "peaceful ones." Meantime Malaysians, with perhaps a strain of Negro blood, ventured across the island bridges of the Pacific, to Central and South America, a long and difficult but not impossible voyage for these remarkable navigators. While these peaceful groups were filtering in from the west quite another type coming from Europe was gradually discovering our eastern coast. Cromagnon man and the warlike Vikings landed on our northern shores, while venturesome Phoenicians (perhaps) were wrecked on the shores of Colombia. At least one fair-haired, bearded stranger reached Mexico and became the culture hero, Quetzalcoatl.

The Mongoloid strain is without doubt the most noticeable one with the straight black hair and the dark color of skin and eye. The Caucasoid element is slighter, the "Armenoid" nose being the most conspicuous trait. The Negroid strain is also faint; its most marked feature being the intricate development of the lambdoidal suture (if, as Dr. Coe asserts, this is really a Negroid feature). That Negroes were in Central America long before Columbus came over is proved by the fact that representations of them with broad noses and thick lips are found on the wall frescos of the Temple of the Warriors at Chichen Itza, a building of the Maya-Toltec period (1190-1448).¹³ One other fact suggests a possible connection with the African

¹³Morris, Earl H., *The Temple of the Warriors at Chichen Itza*, 1931.

Congo Negro. He makes pottery in the same way that the Hopi Indians do, using a pot for a base, and on this building up his jar by the coiled method. He also uses a smoothing spoon of gourd shell. Whether the resulting pottery is at all like that of the Indians would be an interesting side line of investigation.

SIMILARITIES WHICH SUGGEST OUTSIDE CONTACT

The question of the origin of the art of pottery itself is still undetermined. It is, of course, possible that pottery was invented only once and that there was only one center of diffusion. There is, it is true, one great central area over which wheel-made pottery, the most advanced type, is continuously distributed. This includes Asia (China, Mesopotamia, and Persia), Africa (Egypt and Numidia), and Europe (Greece). On the periphery of this area pottery is made by the paddle and anvil or moulded method. Beyond the outside fringes of this peripheral area are found those who use a "non paddle" technique. The inference from this distribution is that Asia is the center of invention.¹⁴ On the other hand pottery is one of the simpler cultural traits which might easily be independently invented in a number of places. All children make mud pies and dry them in the sun. Why should not primitive man, in many different centers, have experimented with mud of different kinds, particularly as he had the incentive of needing a serviceable container. Both theories seem reasonable enough, and arguments can be brought to the support of either one.

Certain indications do point, however, to Asia as one center of ceramic development. Pottery making is a very old art in China, having been going on continuously since the Second Millenium B.C., and even at that early time the art was not in its infancy.¹⁵ Another fact to be noted is that the trail of the early pottery of Greece leads back through Thessaly and Macedonia, pointing to a possible Asiatic or-

¹⁴Gifford, W., *Pottery Making in the Southwest*, 1926-1928, pp. 353-373.

¹⁵Liang, Sau Yung, *New Stone Age Pottery from Prehistoric Sites in China*, 1930.

igin. As this earliest pottery is not unlike that found in the ancient Chinese graves, it is possible that there may be some connection. Also, from a center somewhere in Asia the ancient Sumerians may have passed on the knowledge of pottery to their contemporaries in Egypt. Trade was flourishing even at that very early time. By sea the captains of the tiny crafts took incredible risks, following the coast or sailing from island to island. There were also trade routes overland. One such existed about 1200-1100 B.C. between the northern part of China and Troy. Thus, ideas about pottery, if not the actual pieces, could have travelled far. Could they, however, have reached far-off and backward America? It seems as if they could not possibly have done so; and yet there are striking similarities between Old World and New World pottery. These are, in all probability, wholly accidental as the tribes producing these early wares were in a very primitive stage of culture, and they were situated so far from each other that contact of any kind seems hardly possible. There is also the fact to be considered that the design elements which are found all over the world are such as might come either from the technique of pottery itself, or from that of weaving which frequently preceeded pottery. For instance, the Proto-Elamite pottery (from Susa, Persia) shows patterns which are almost identical, some with those found on the Red-on-Buff of the Middle Gila, others with the design elements on the early Kayenta Black-on-White, or that of the Rio Puerco. Also from Susa come jars on which are painted sheep with huge curling horns drawn with a freedom which calls to mind the curves used on Hopi and Zuni ware. In this case it is the general distribution of the design quite as much as the elements themselves which seems to come from a similar creative impulse or art ideal. In Thessaly sherds have been found which might easily be taken for Red-on-Buff, whereas a predynastic Egyptian sherd from Nubia was so exactly like a Red-on-Buff sherd in color, pattern, and texture, that a pottery mender tried, absent-mindedly to fit the two together. There are in the Field Museum in Chicago some predynastic Egyptian

pots, slipped red with smudged black interiors which, Fewkes said, are made in the same way as the smudged bowls of the Gila region. A black and white olla from the Kayenta Wash recalls to mind the Minoan jars with the octopus decoration. A pot from the Greek island of Thera is ornamented with the meander with diagonal hatching so characteristic of the pottery from Chaco canyon. Checkerboards and stepped designs are common in early Greek pottery as they are in that of the Southwest. All of which proves nothing but is interesting to note. The pottery of this region also shows certain suggestions of similarities with the wares produced in Mexico in prehistoric times. In this case, however, it seems reasonable that there should have been contact and that Mexican ideas should have found their way to the north.

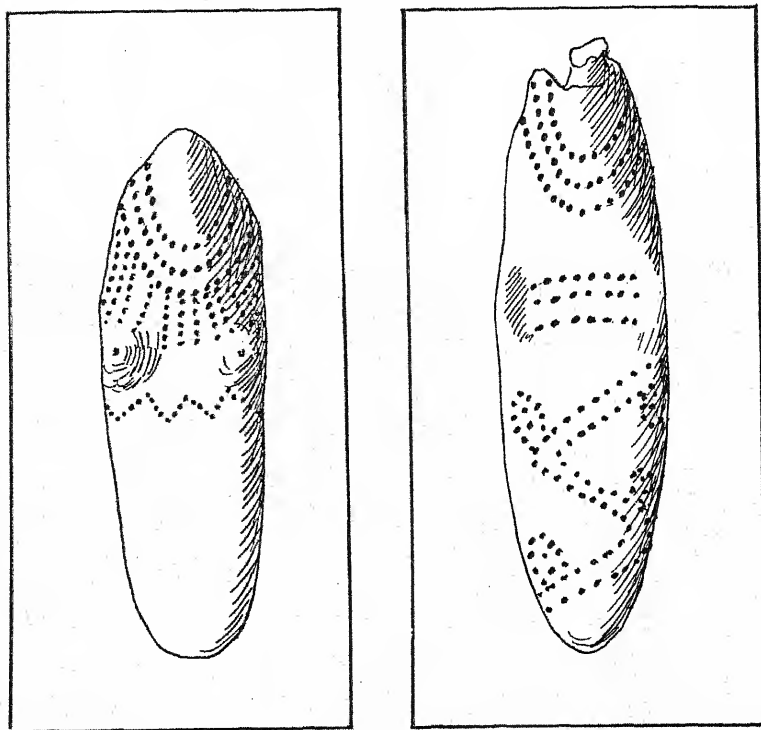


Figure 3.—Sketches of figurines of the earth mother.

Also often of clay are the figurines of the earth mother, the goddess of fertility, which are found all over the world. Dr. Cummings has found two such rude statuettes in the Southwest, the closest parallels to which are to be found in the stone sculpture of Neolithic times in the south of France. Here there seems to have been no possibility of contact. Probably the Southwestern figurines are more closely related to the archaic figurines of Mexico which call to mind the primitive goddesses of Thessaly and Crete. All the statuettes seem to have come from a common Aegean origin;¹⁶ the little figures from Arizona seeming to belong to the same divine family.

CLASSIFICATION OF POTTERY AND ITS CHRONOLOGY

There is a bewildering variety of painted pottery types to be found in the State of Arizona. Some of these date from very early times, that is, from the very first beginnings of pottery making; and some are being made at the present moment by the many skillful Indian potters who are carrying on worthily the traditions of their ancestors.

These many kinds of painted pottery may be divided into four main groups based on color alone. These are, Black-on-White, Black-on-Red, Red-on-Buff, and Polychrome. This classification does not include the corrugated pottery nor that in which the coil is partially obliterated. On both of these types is found at times a geometric decoration in fugitive white. These four (or five if the Brown-on-Yellow is distinguished from the Black-on-Red) groups, or genera, are subdivided into smaller classes to which a more specific name is given; and these are again divided into small local groups.

The art of painting pottery is almost, though not quite, as old as the art of pottery itself. Crude line decorations, and even crude animal, human, or plant forms are found on the clumsy gray fired bowls of very early times, first attempts both in pottery making and in design. These

¹⁶Renaud, (Abel) Etienne Bernardeau, *Prehistoric Female Figurines*, 1929, pp. 507-512.

CLASSIFICATION OF POTTERY

Black-on-White (Black-on-Gray)	San Juan	Chaco Canyon	
		Mesa Verde	
		Kayenta	{ Sagie Nitsie Marsh Pass
	Tularosa Upper Gila	Little Colorado (Puerco)	
		Roosevelt	
	Mimbres		
Black-on-Red	Prescott (Black-on-Gray)		
	Kayenta		
	Little Colorado		
	Middle and Upper Gila		
Red-on-Buff or Hohokam			
Brown-on-Yellow, or Old Hopi			
Polychrome	Kayenta	Red and Black on Orange	
		Red, Black, and White on Orange	
		Black and White on Red	
		Four Mile	
	Little Colorado	Pinedale	
		St. Johns	
		Houck	
		Ancient Zuñi (Heshotanthla)	
	Gila Polychrome	Early	
		Late	
	Tucson Polychrome		
	Nogales Polychrome		
	Sikyatki		
	Pecos (Zuñi)		

early fired pots seem to date from the time when the first permanent houses were built, the round pit houses. Before that time the aborigines had lived in caves or in the most perishable type of brush shelter. Even then they were trying to make pottery and to fire it in the sun. From these early times it is possible to trace the continuous development of pottery, and also the development of its decoration through its many stages up to the present day.

There are two systems of classification in use in the Southwest of which variants are constantly suggested. The situation is a complicated one as each archaeologist gives a new name to his finds if they vary ever so slightly from those hitherto found. The simpler and more logical system of classification is that of Dr. Cummings, in use at the University of Arizona. This one is based throughout on house types. The objection made to it is that pit houses and community houses were existing at the same time in different areas. The other classification is that of the Pecos conference. The two systems may be correlated thus:

UNIVERSITY OF ARIZONA		PECOS CLASSIFICATION
Archaic Period	About 1,500 B.C.	Basket Maker I
Nomads		
Cave People		Basket Maker II
	Beginning of Christ- ian Era	
Early Pueblo Period		
Round Pit House		Basket Maker III
Transitional Pit House		
	A.D. 150-650	Pueblo I
Rectangular Pit House		
Late Pueblo Period	650-Present time	
Small House Type		
	650-900	Pueblo II
Unit House Type		
Rambling Pueblo	a. 900-1200 A.D.	Pueblo III
Community House	b. 1200-1350	
Decadent	1350-1540	Pueblo IV
Historic	1540-Present time	Pueblo V
Modern	1700-Present time	

The first three periods are based on basket making, and the others on pottery types. The objection to this is that no baskets were made in the first Basket Maker period, and that better baskets were made in Pueblo III than in Basket Maker III. Also the word "Pueblo" with its accompanying numbers suggests house types without indicating them. However, there is always some objection to every system.

This chronology from 700 A.D. to the present time is that of Dr. Douglass of the University of Arizona, who has discovered a system of dating prehistoric ruins by means of tree rings.¹⁷ This calendar of prehistoric time extends over a period of about two thousands years.

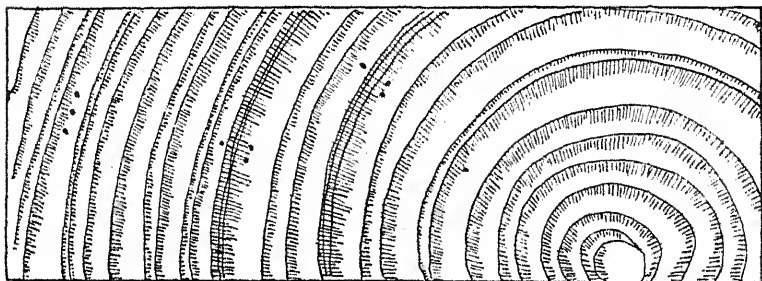


Figure 4.—Section of a tree showing the climatic cycles that point out the years of minimum and maximum moisture.

THE BEGINNINGS OF POTTERY

In the San Juan drainage, in the northeastern corner of Arizona, in Sagie and Nitsie canyons, and in the Canyon del Muerto, as well as in the contiguous corners of New Mexico, Utah, and Colorado, it is possible to trace the development of pottery from its earliest crude beginnings.

The pottery making complex almost always accompanies the beginnings of agriculture, and such appears to be the case here in the Southwest. It does not seem probable, however, that corn was evolved from its grassy prototype,

¹⁷Douglass, A. E., "The Secret of the Southwest Solved by Talkative Tree Rings," *The National Geographic Magazine*, vol. 66, pp. 337-770.

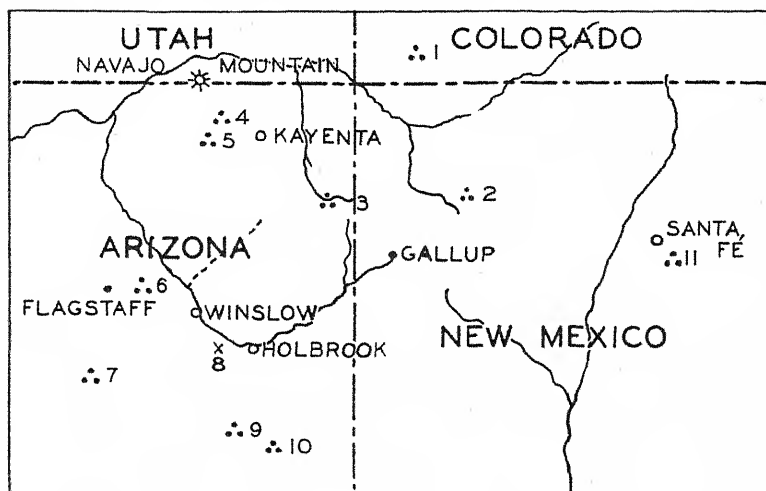


Figure 5.—Showing prehistoric Indian pueblos that have been dated by the Douglass Tree Ring Method.¹⁸

- | | |
|----------------------------------|---------------------------|
| 1. Mesa Verde, 1073-1262 | 6. Turkey Hill, 1203-1278 |
| 2. Pueblo Bonito, 919-1130 | 7. Montezuma Castle |
| 3. White House Pueblo, 1060-1275 | 8. Chaves Pass, 1381 |
| 4. Keetssiel, 1203-1278 | 9. Pinedale, 1200-1320 |
| 5. Betatakin, 1260-1277 | 10. Showlow, 1174-1383 |
| | 11. Pecos |

teocentli, in this area, but rather that it was brought from the highlands of Mexico. With it, without much doubt, must have come the memory of the fact that pottery could be made from clay. It seems fairly evident, however, that nothing but this idea, or memory, of clay pots reached the San Juan region, since there are numerous examples of the very earliest experiments in the making of clay containers, which show no knowledge whatsoever of how to go to work to produce a smooth and well fired pot. Some of these first vessels seem to have been made of a lump of clay pressed into a shallow bowl-shaped basket. This, when dry, was removed from its mold without destroying the basket. The rough exterior surface shows wear, but not

¹⁸*Op. cit.*

burning; the interior is plainly marked with fingerprints.¹⁹ These early, clumsy, sun-dried dishes are made of a coarse paste, dark gray or reddish in color, and they are tempered with cedar bark to make them stronger. With the cultivation of corn came the greater need of fireproof and water-tight containers.

The earliest attempts at firing resulted in a thick-walled, half-baked, rough, gray ware. These pots are so crude and so unevenly baked as to suggest an accidental discovery, or an independent invention of the process. At this time the bowls, examples of which are in the Arizona State Museum, seem to have been moulded from a ball of clay; since these show no trace of a basket mould, but only of fingerprints, both inside and outside. Perhaps rings first and then coils were added to the larger bowls to make ollas and cooking vessels, and to the smaller bowls to make pitchers and cups. An effort was soon made to make these pots smoother and of a more symmetrical and beautiful shape. Very soon after this came the desire to apply a painted decoration, to the bowls in particular.

THE ORIGIN OF PATTERNS

The only decorative designs, which these primitive people had had up to this time, seem to have been those used in weaving, in which art they had become very skillful. Thus their repertory of patterns, though not small, was necessarily confined to those geometric or conventional designs which come naturally in the technique of weaving, and which could be carried out in the baskets, sandals, and belts which they made in great numbers. Of these articles the shallow, bowl-shaped baskets most closely resembled the newly invented pottery bowls. Thus it would seem reasonable to look for the prototypes of the patterns on the early bowls in those of the early baskets. Some of the early pottery designs have indeed very evidently been inspired by these basketry patterns, but they are in the main adaptations rather than exact copies. Certain features are, however, the same. The

¹⁹Morris, Earl H., *The Beginnings of Pottery Making in the San Juan Area*, 1927.

central circle and the rim line are common in baskets, as are also the radiating zigzags. The division of the field into two, three, or four areas and the use of balanced units are also characteristic of basketry patterns. Some of the patterns on early bowls would however be difficult, if not impossible, to carry out in a coiled basket. They have perhaps arisen rather from the technique of pottery itself, with of course, as a basic idea, the conception of design already developed for baskets. These early pottery patterns are composed of dots and lines which are the easiest motives to make with a brush and, in their adaptation from basketry patterns, show the irregularities and the change of form which the greater freedom of brushwork and the manipulation of different materials would necessitate.



Plate I.—A black and white seed bowl.

Number 1720 in the Arizona State Museum. Found at Bubbling spring, a branch of the Sagie canyon, in the Navajo reservation, Arizona, by the University of Arizona expedition in 1916. Height $6\frac{1}{8}$ inches, diameter 9 inches, opening $5\frac{3}{8}$ inches.

Though the geometric type of pattern predominates, there is another type in which the early potter gave full rein to her powers of invention. This is the realistic type in which the attempt to portray the living forms of men, plants, and animals, as they appeared in nature, resulted in some extraordinary creations. Though these stiff and strange figures seem far from "natural" according to our point of view, they seem very realistic when compared with the conventionalized symbols of life forms which are found in the later prehistoric art. This phase of art, uncommon in the San Juan district, was much more highly developed in the Red-on-Buff (the Hohokam) pottery of the Middle Gila. Here many zoomorphic and anthropomorphic designs were rendered with joy and freedom, though in this region as well as in the north the geometric type of decoration predominated, and eventually superseded almost entirely the realistic type by the end of the early Pueblo period.

THE EARLY POTTERY OF THE SAN JUAN AREA

Before considering the Kayenta pottery in greater detail some mention should be made of the other two types of pottery which developed in this region, though outside the boundaries of the State of Arizona. These are the Chaco canyon type found in New Mexico, and the Mesa Verde type found in Colorado.

Chaco Canyon

The characteristic decorated pottery from Chaco canyon is Black-on-White ware. The slip is almost as white as white paper and the black is a true black at the period of highest development. In early times the slip is not such a good white and the black is often of a brownish tone. The designs are in the main geometric, fine lines and balanced patterns of solid black triangles and stepped figures being of frequent occurrence. Perhaps the most noticeable characteristic is, however, the fine diagonal hatching enclosed in a broader line. The conventionalized "bird wing" pattern and the interlocked scroll or water symbol, both cur-

vilinear and rectilinear are treated in this way. Zonal patterns are common, particularly on bowls, and these are often framed by one rather narrow line. The rims of bowls are very often painted black. Characteristic shapes of the region are the hemispherical bowls, the long necked pitchers, and the cylindrical pots found at Pueblo Bonito, which suggest a Mexican prototype.

Mesa Verde

From the Mesa Verde district comes another distinctly individual type of ware which is easily distinguished by the



Plate II.—A Little Colorado pitcher.

Tularosa type. Number 19244 in the Arizona State Museum. From the Scores collection. Found near Holbrook and presented by Gila Pueblo in 1930. Height $5\frac{1}{2}$ inches, diameter 6 inches, opening $3\frac{1}{8}$ inches.

slip which is creamy, or even gray, rather than white, and which has a peculiarly lustrous and slippery appearance. The geometric zonal patterns on the bowls, though very like those of Chaco canyon in design, are framed by several parallel lines, and on the flat rims of the bowls are the black marks called "ticks." Other bowls show patterns composed of balanced solid and hatched figures, very similar to the scrolls and stepped figures which are found so frequently in the "Tularosa" ware, and in the St. Johns and other Polychromes of the Little Colorado area. As to shapes, the mug, or "beer stein," is characteristic, and also the handles low down on the sides of the ollas.

KAYENTA POTTERY

In this district, as well as in other parts of the San Juan drainage, it is possible to follow the development of pottery from its earliest crude beginnings among the cave people. Each step in this development can be illustrated from a specimen of pottery in the Arizona State Museum, where the unfired pottery of the cave people is to be found, as well as the finest pieces of Late Pueblo times. The history of decorated pottery begins with that of the earliest house type, the circular pit house; and its periods of development correspond rather closely to the changes in the house types. This first early pueblo pottery is poor in finish and of a coarse paste. Even when it is slipped it is gray rather than white in color, and the decoration is in a brownish gray rather than in a good black. This decoration is irregularly and badly spaced and most unskillfully applied. It is not, however, wholly without merit. There is an evident attempt to arrange the pattern according to a definite plan, in spite of the haphazard appearance of many of the designs. The division into two, three, or four fields is apparent from the very beginning; as is also a definitely balanced arrangement in which the two opposing elements are intended to be alike. Lack of skill alone prevented some of these bowls from being beautiful, since the basic idea is a sound one.

The elements of design used in this earliest pottery are: very fine lines either straight, zigzag, or wavy; dots, some of which are long enough to be called short lines, or fringes; solid triangles of two shapes, one broad and one long and narrow, one so common in basketry patterns; and a simple form of meander. With these few elements the potters experimented until they had a variety of patterns to bequeath to their immediate descendants who slowly improved on their inheritance, using the same motives but arranging them differently. Two or more fine parallel lines were then used to outline a solid figure such as the rectangle or the row of triangles which form the solid black part of the design. Dots were used less frequently to fill areas but more often to border lines or the side of a triangle.

Plate I shows a seed jar of early times.

EARLY PUEBLO BLACK-ON-WHITE

Lines and Triangles

Other motives were invented, or adapted, such as the stepped figures and the checkerboard, which must have been familiar to the potter for a long time, since these are both patterns which come easily in the technique of weaving. The use of a border pattern of wavy lines, however, such as is found on seed bowls, seems to have come from the technique of pottery rather than from a textile prototype. More elaborate arrangements of all these elements resulted in more complicated patterns toward the end of the period, when zonal patterns on bowls are of frequent occurrence, though these bands more often consist of panels separated by fine vertical lines than of running, or continuous, designs. At the same time with the improvement in the design had come, of course, marked progress in all phases of technique, and the pottery at the end of the period is much better in every way. The paste is finer; the pieces are of more regular and beautiful shape; the walls are thinner; the slip is whiter and the black paint is deeper in color. The smoother finish, the clearer white and black, the more pleasing shapes, and the increased skill of the

artists in handling their tools make this period of pottery a good foundation on which to build the remarkably fine development of the art in later times.

Broad Lines

During the time when rectangular pit houses were being built, and continuing on into the early phases of the Late Pueblo period, is a new type of design. Sudden changes in styles of all kinds take place, and Kayenta pottery is no exception to this rule. For some reason fine lines went out of style almost entirely and broad lines came into favor.

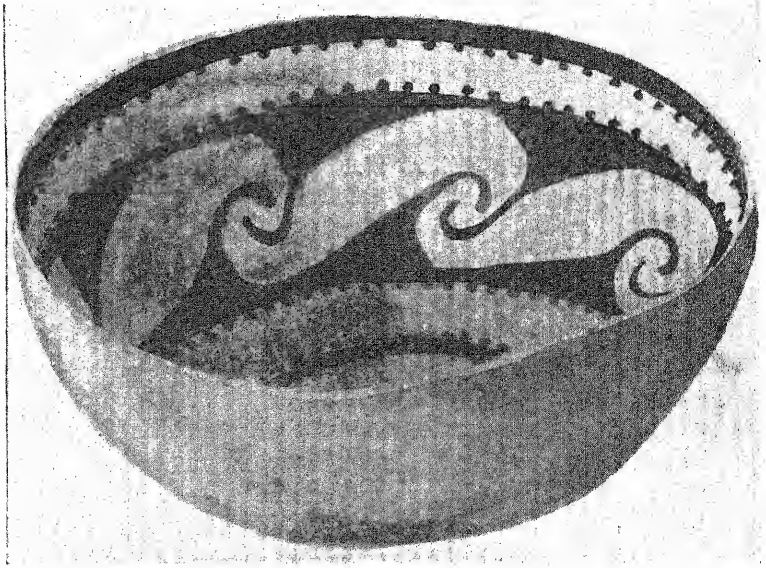


Plate III.—A black and white bowl.

Number 4258 in the Arizona State Museum. From the Miller collection. Found at Paopka. Property of the Arizona Archæological and Historical Society. Diameter $7\frac{3}{8}$ inches, depth $3\frac{5}{8}$ inches.

There is no sudden break in the type of design, since the same elements are used as in the first type, but the use of broad lines inspired a different arrangement and gives a very different effect. These long broad lines with here and there the emphasis of a solid black triangle made an effective

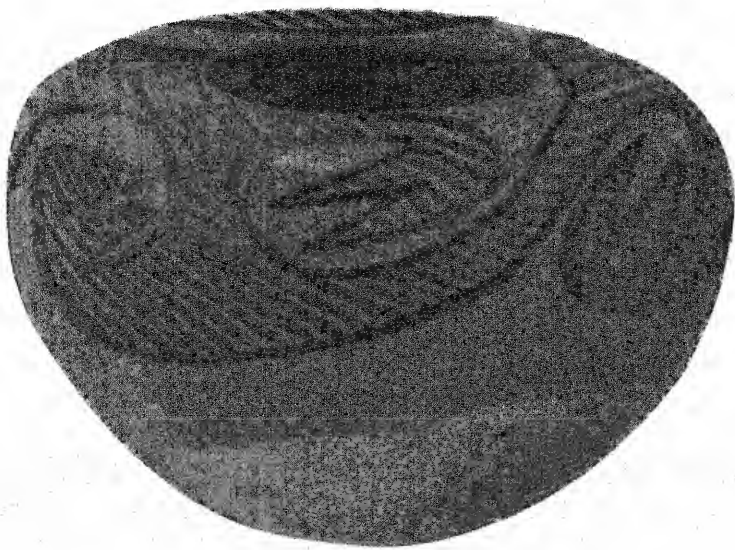


Plate IV.—Kayenta Black-on-Red

Number 18162 in the Arizona State Museum. Found near Kayenta by the University of Arizona expedition. Height $5\frac{1}{2}$ inches, diameter $8\frac{5}{8}$ inches, and opening $4\frac{3}{8}$ inches.



Plate V.—Kayenta Black-on-Red

A small seed bowl found in Kaycuddy wash near Kayenta by the University of Arizona expedition in 1920. Approximate dimensions: diameter $4\frac{1}{4}$ inches, height $3\frac{1}{2}$ inches, opening $1\frac{3}{8}$ inches.



Plate VI.—Kayenta Polychrome

An olla found by Dr. Cummings in 1928 in Kaycuddy wash, five miles from Kayenta. Approximate dimensions: height $7\frac{1}{2}$ inches, diameter $8\frac{1}{2}$ inches, opening $3\frac{1}{2}$ inches.



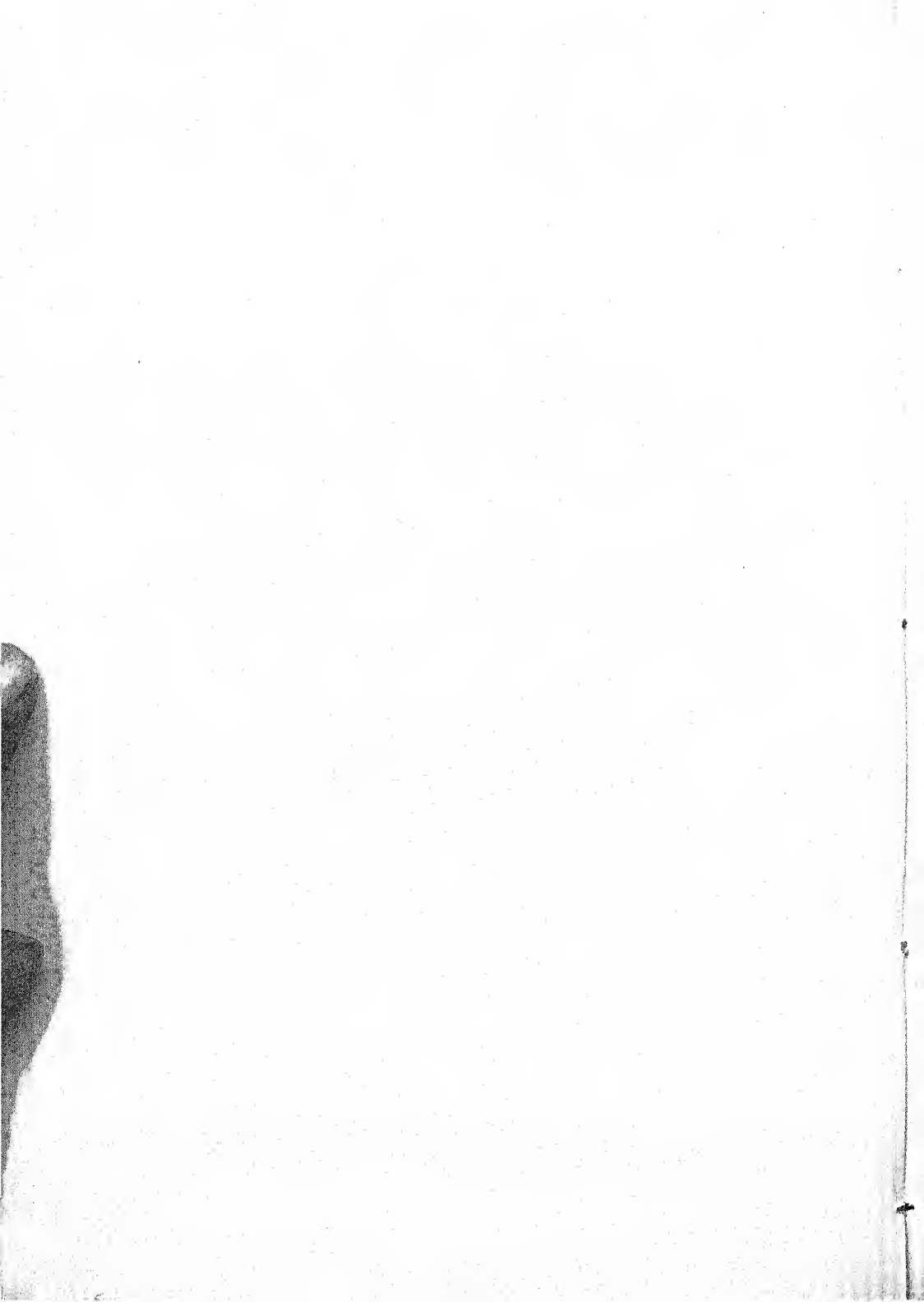
Plate VII.—A Red-on-Buff pitcher.

Number 2516 in the Arizona State Museum. Found near Kayenta, Arizona by the University of Arizona expedition in 1919. Diameter $5\frac{1}{8}$ inches, height $4\frac{1}{16}$ inches.



Plate VIII.—Kayenta Polychrome.

This olla was found in a cave in Nitsie canyon in 1916 by the University of Arizona expedition. Approximate dimensions: height $7\frac{1}{4}$ inches, diameter $9\frac{1}{4}$ inches.



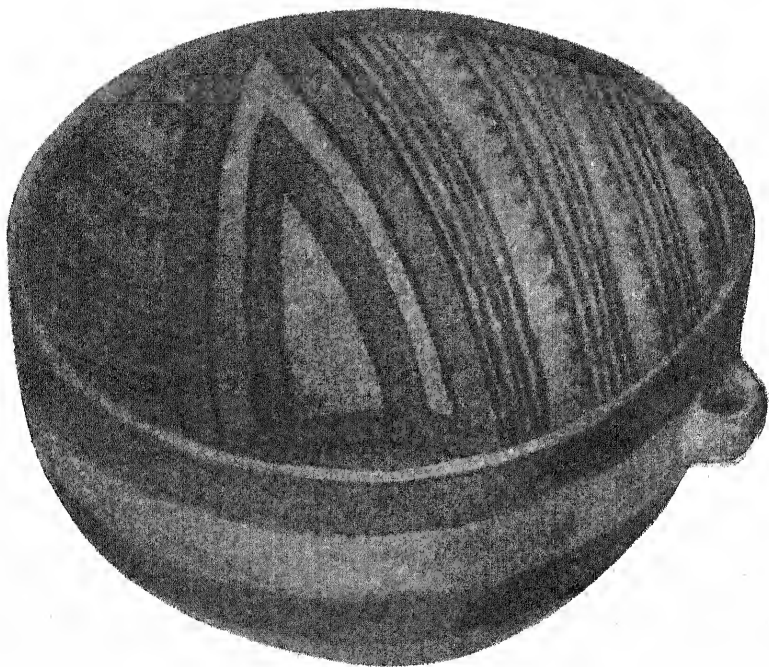


Plate IX.—Kayenta Polychrome bowl.

Number 3747 in Arizona State Museum. Found at Tachini Point near Marsh Pass by the University of Arizona expedition in 1923 in the lower burial ground. Diameter 10 inches, depth 6 inches.



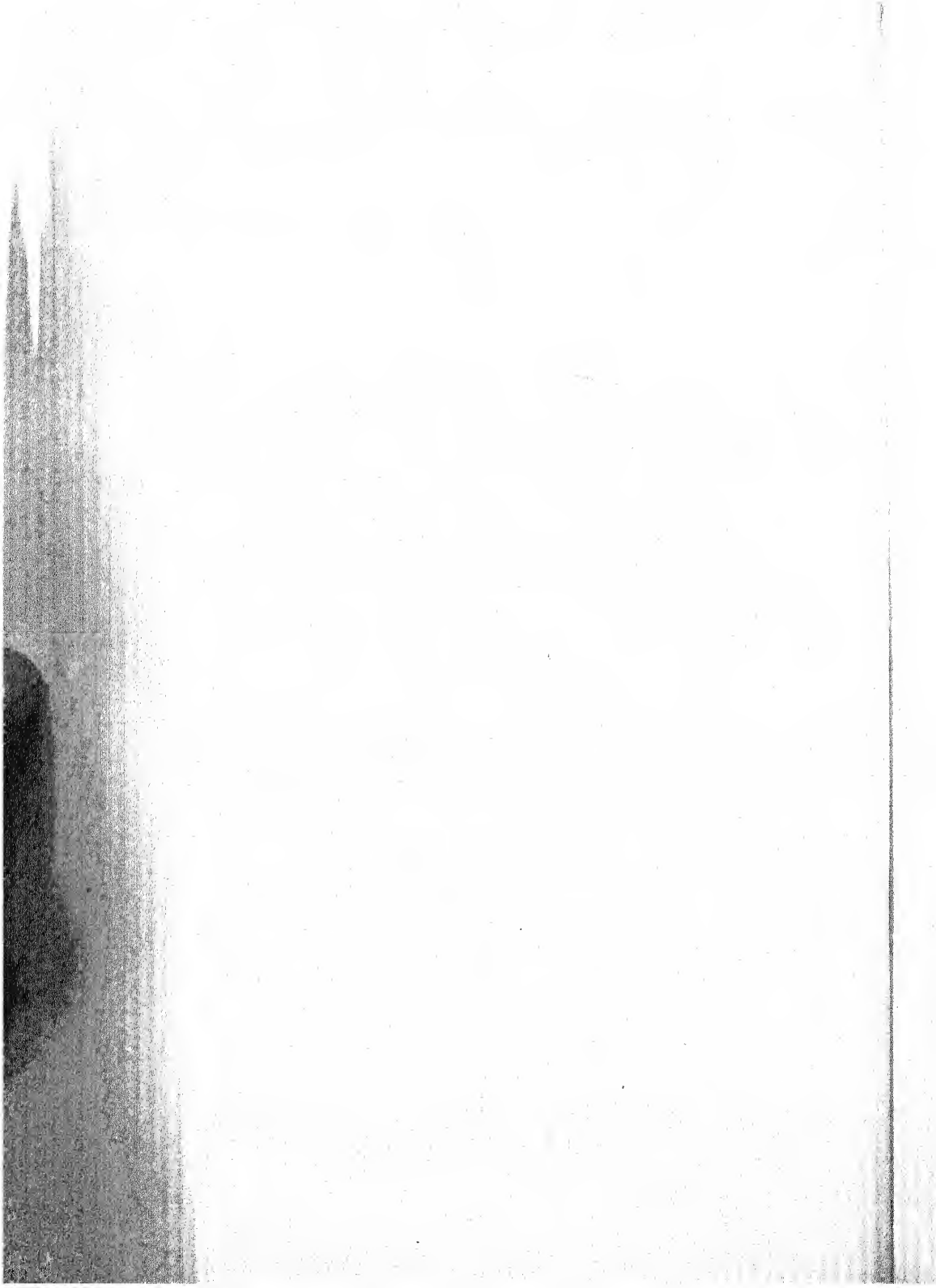
Plate X.—Little Colorado Black-on-Red.

Number 19287 in the Arizona State Museum. From the Scores collection. Presented by Gila Pueblo in 1930. Found near Holbrook. Diameter $12\frac{1}{2}$ inches, depth $5\frac{5}{8}$ inches.



Plate XI.—St. Johns Polychrome.

Number 17495 in the Arizona State Museum. Found at Turkey Hill Ruin near Flagstaff by the University of Arizona expedition of 1929. Diameter of opening $8\frac{1}{2}$ inches, greatest diameter 9 inches, depth $4\frac{3}{16}$ inches.



decoration for bowls or ollas. Dots were used either to border the whole line, or only certain sections of it. They were also used all around a triangle or on one side only, depending on where they would give the best effect and relieve any monotony resulting from the use of so few elements. There is, however, a surprising variety of patterns of this time, though some may consist of lines only and some of triangles only. Others are varied by the use of stepped figures. Designs made up of lines alone may be very complicated and beautiful, particularly when the lines are bent into triangular or rectangular "scrolls" and are used as a zonal decoration around a bowl, pitcher, or olla. A simple and effective new element added during this period is the hook, or flag, attached to the point of the triangle. This makes a common, ordinary triangle look so much like a duck that this name has occasionally been applied to this pattern. These figures placed in opposing rows give a simple form of interlocked scroll from which the more elaborate type may perhaps have been developed. This type of design lasted into the Late Pueblo period.

LATE PUEBLO BLACK-ON-WHITE

"Proto-Kayenta"

From this combination of broad line and triangle, a new idea seems to have come into being, that is the serrated line, which is really a broad line bordered with triangles, and not just a row of triangles as in earlier days. This new idea swept over the Kayenta area and transformed the decorative scheme of black and white pottery. This type, though a logical development of the preceding, is so distinctive that Kidder has given it the name of "Proto-Kayenta." Two broad serrated lines, when placed opposite each other, left between them a narrower zigzag line of white. This proved to be a most strikingly effective unit for the building up of rather complicated designs, giving the effect of a white lightning pattern on a dark ground. This particular phase of "negative design" seems, however, to have been of short duration since the possibility of varying



Plate XII.—A black and white olla.

Found near Kayenta by the University of Arizona expedition. Approximate dimensions: height 10 inches, diameter 12 inches, and opening $6\frac{1}{2}$ inches.

and elaborating this very beautiful type of design was soon seen.

Practically contemporary with this type of negative design and perhaps even a little earlier, are those patterns which are so strongly reminiscent of Chaco-canyon ware in their diagonal hatching with slightly broader outline. The design elements treated in this way are a large bird wing, a rectangular scroll, and the "octopus" type of patterns, as well as others suited to this technique.

Negative Patterns

It is in this later period of Black-on-White that the negative designs predominate. These are designs in which



Plate XIII.—A Black-on-White "negative" pitcher.

Number 12274 in the Arizona State Museum. Found in a burial in Kaycuddy wash, near Kayenta, by the University of Arizona expedition in 1920. Height $4\frac{1}{2}$ inches, diameter $5\frac{3}{8}$ inches, opening 3 inches.

the pattern is left in white on a painted background of black. There are three phases of this kind of ware which may possibly represent three stages of development. Practically the same elements are used in all three phases; interlocking scrolls, stepped figures, and triangles being the most common. Very broad black lines are used to frame the area in which these motives are grouped. The main difference in the three types is in the treatment of the white lines and spaces within these wide bordering lines. In the first phase this white space is left plain, being merely a narrow white line of pattern on a black ground (Plate XIV). In the second phase there is more of this white space and it is hatched longitudinally. This is most effective as the broad black lines now frame in a panel in which a black pattern stands out on a



Plate XIV.—A Kayenta olla.

Found at Turkey Hill Ruin near Flagstaff and now in the Arizona State Museum. University of Arizona expedition in 1927. Approximate dimensions: height $12\frac{1}{2}$ inches, diameter $13\frac{1}{2}$ inches, opening $5\frac{1}{2}$ inches.

hatched ground (Plate XV). The third phase shows a black pattern on a crosshatched ground, which makes the pottery of this style resemble a cross word puzzle to some extent (Plate IV). Ollas and bowls of both these types are in the Arizona State Museum. They were found in Sagie and Nitsie canyons near Kayenta and at Turkey Hill Ruin near Flagstaff. In these pieces the longitudinal hatching is used much oftener than the crosshatching though this type of background seems to have been quite as popular and well developed all over the area.

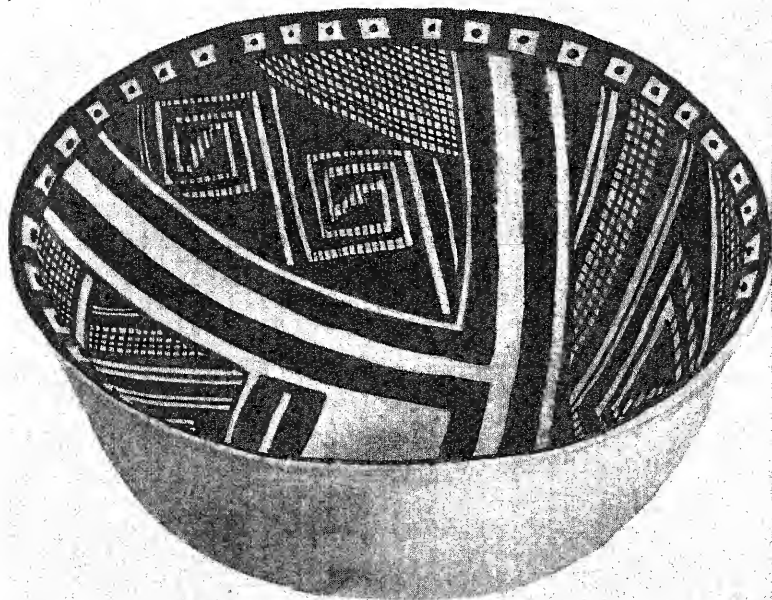


Plate XV.—A bowl with negative pattern.

Found in Sagie canyon near Kayenta by the University of Arizona expedition in 1916, and now in the Arizona State Museum. Diameter $12\frac{3}{4}$ inches, depth $5\frac{1}{2}$ inches.

KAYENTA BLACK-ON-RED

Though Black-on-White is the ware most commonly found in the northern part of Arizona, the ancient inhabitants did not confine themselves to this color scheme. Almost as soon as they were able to make really good Black-on-White pottery, they also began to make some Black-on-Red. The designs on the Black-on-Red pots follow closely in their development the course of the Black-on-White. They are, however, relatively rare in the early period, becoming much more common in the late period when Black-on-Red and Polychrome wares gradually became popular. The large seed bowl and the small jar illustrated in Plates IV and V belong to the earlier period in their type of design. These two bowls were found in the same region

and Plate IV shows one of the patterns most frequently used in the Late Pueblo period, the bird wing. The possible place of origin of this design is interesting speculation. It was one of the patterns in use during the early Toltec period in Mexico. This is a distinctive pattern and not a common one except in certain localities and it seems as if so unique a pattern would not have been invented independently in two localities so near each other. Perhaps this is one of the connecting links between Mexico and the Southwest.

Kayenta Polychrome Derived from Black-on-Red

There are two distinct types of this Polychrome ware. A group of Polychromes was developed from the Black-on-Red, first, by the simple process of leaving the lower part of the bowl unslipped. The orange color of the unslipped clay gives a third color to the piece, though the upper part may still be classed in every way a typical Black-on-Red vessel (Plate IV). A second variation is called a Polychrome also, since a white line is used to outline the hatched pattern. There is still a third Polychrome type apparently derived from the Black-on-Red, a late Polychrome type, in which broader black lines and solid patterns are outlined in narrow white lines. Different geometric motives are used, the stepped figure being particularly common. This type of pattern, which resembles designs used on the Black-on-White pottery which it supplanted, is found mainly on ollas. It is possible that the bird wing continued in use for seed bowls until the end of the period.

KAYENTA POLYCHROMES

Possible Origin

While this type of Polychrome was developing from the Black-on-Red, another and entirely different kind of Polychrome ware had made its appearance. This, particularly in its early phases, is very unlike the other wares produced in the Kayenta district. It suggests the possibility of contact with, and influence from the Hohokam people of the

Middle Gila. Such a contact is also suggested by the finding of a Red-on-Buff pitcher of Kayenta shape with a pattern of realistic birds, a common motive in early Red-on-Buff. As this pitcher, or cup, is not like any Red-on-Buff piece, there is a possibility that some Indian trader or traveler saw something like this piece and tried to have what he had seen reproduced when he got home. Even these prehistoric Indians took long journeys when they were in need of some special "medicine." There is also a Red-on-Buff collander ornamented with a broken key which has a stepped triangle attached to it. This is a pattern very commonly found in Mexican designs. The color and finish of this piece are also very similar to a sherd of Toltec pottery in the Arizona State Museum. The likeness is sufficient to suggest the probable importation of this piece.

Kayenta Polychrome

The early Kayenta Polychrome is characterized by the use of a broad red line outlined in black on a deep buff or orange ground. The type of design is bold and simple, consisting frequently of broad lines with sharply pointed triangles attached. In fact, it seems to be the same serrated line which is found so commonly in the late Red-on-Buff but which was also common, though on a smaller scale, in the Kayenta Black-on-White. Sometimes this pattern develops into something very like a bird wing.

These broad serrated lines gradually went out of style, though for a while they seemed to have been sparingly used in connection with patterns which are more typical of the region. The colors used are: first, black and red on orange, to which white was added later for outlines. Bowls of this period are frequently divided into four fields, as in the Black-on-White type, and the geometric patterns are not unlike those on the Black-on-White, though long parallel lines with dots attached, and hatched areas are more common than negative patterns. On the exterior of the bowls there is always a broad band or two of red slip which is not outlined in black as are the lines on the interior.

Though Kayenta pottery shows to some extent the influence of other wares, it has a continuous local and distinctive development. Its influence is strongly felt in the pottery from Turkey Hill Ruin near Flagstaff and also in the pottery made along the Rio Puerco and in the Roosevelt district. The Black-on-Gray from Prescott seems also to be an echo of Kayenta spirit through the medium of Turkey Hill art ideals.

THE POTTERY OF THE LITTLE COLORADO

This area lies between the San Juan drainage to the north and the Gila drainage to the south. As a culture area, however, it seems to belong to the northern, rather than to the southern group. In it is found a great diversity of pottery types, some of which seem to show influence from the outside, particularly from the north and east, while others seem to be of local inspiration.

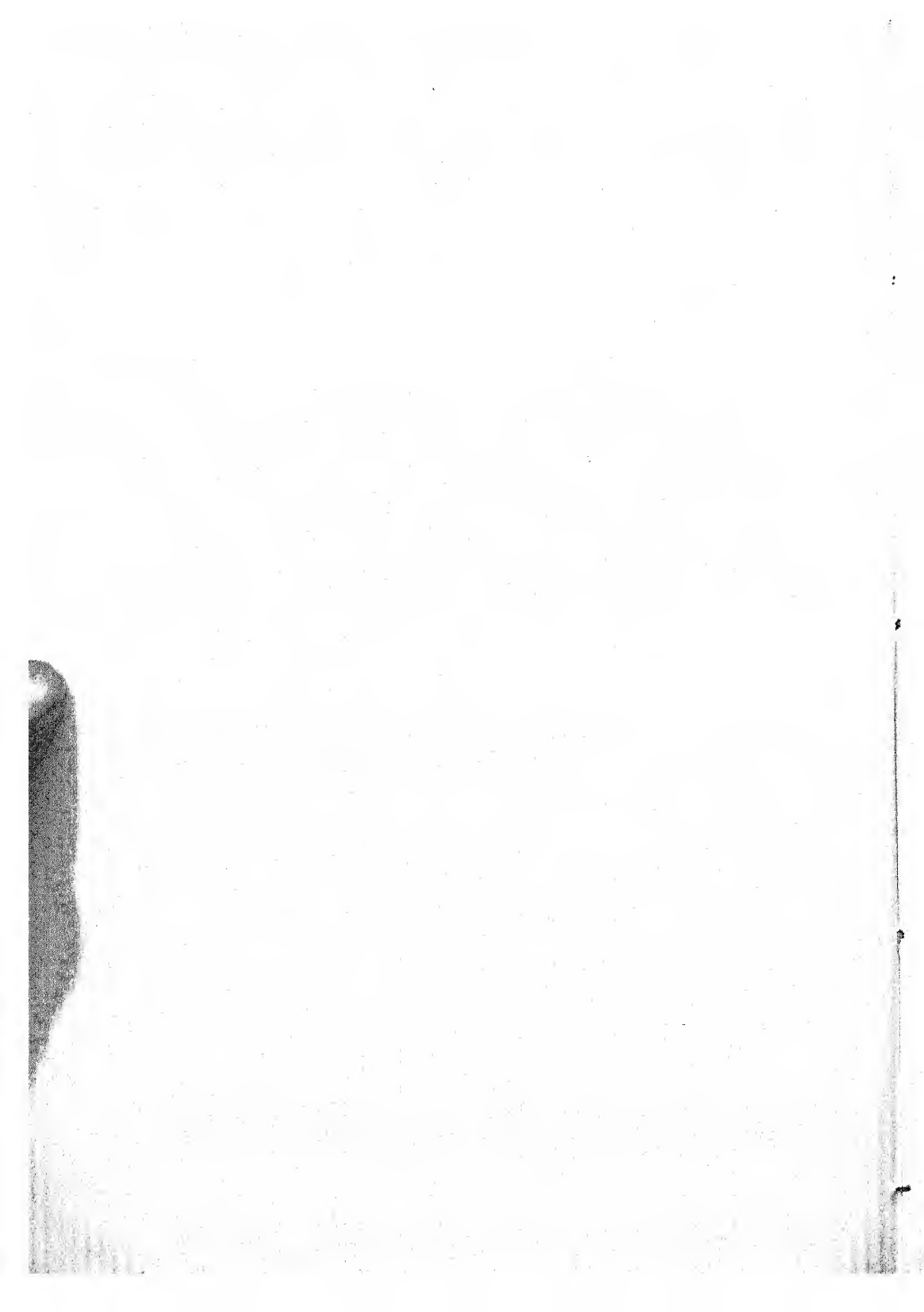
BLACK-ON-WHITE (TULAROSA)

The earliest decorated pottery of the region is the Black-on-White which is distributed over the whole area, each section having its own local variation. One phase of the Little Colorado Black-on-White is that found along the Puerco river. This, in its earlier stages, is a somewhat crude pottery with poorly executed designs which recall to some extent those of Chaco canyon and Kayenta. Common motives are the pendant triangles, checkerboard designs, and also the broad serrated line with slanting, sharply pointed teeth. This early Black-on-White of the Little Colorado area went through the same stages of development as did its northern neighbors. Fine lines were succeeded by broad lines, and these in turn by more complicated arrangements of various elements derived from the north. Another type of Black-on-White is that found at Turkey Hill Ruin near Flagstaff, also in the Little Colorado drainage. Here is found a type of pottery which seems to be more closely related to the Kayenta ware in the choice of elements of design. The white lightning zigzag on a black ground is very common, as



Plate XVI.—A Pinedale bowl.

Number 6289 in the Arizona State Museum. Diameter at rim $8\frac{1}{8}$ inches, greatest diameter 9 inches, depth $4\frac{1}{4}$ inches.





XVII.—Four Mile Polychrome.

Number 19449 in the Arizona State Museum. Presented by Dr. Cummings, 1930. Found in burial 3, Banning Wash Ruin, Cherry creek, Pleasant valley, Arizona. Diameter at rim $6\frac{5}{8}$ inches, depth $3\frac{1}{8}$ inches.





Plate XVIII.—Upper Gila Black-on-Red.

In the Arizona State Museum. Found at Gila Bank Ruin by the University of Arizona expedition in 1927. Approximate dimensions: height 9 inches, diameter $10\frac{1}{8}$ inches, opening $5\frac{1}{4}$ inches.

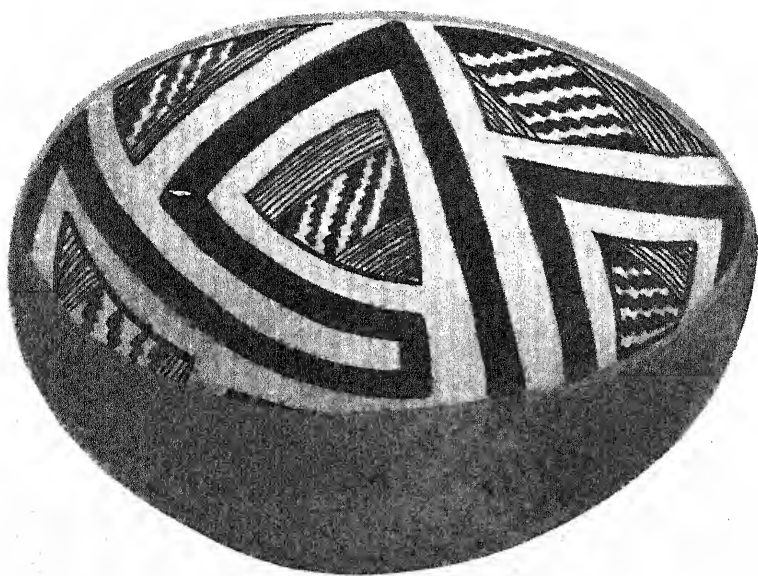


Plate XIX.—Early Gila Polychrome.

A bowl from Gila Bank Ruin. Found by the University of Arizona expedition in 1927. Approximate dimensions: diameter 10 inches, depth $4\frac{3}{4}$ inches.



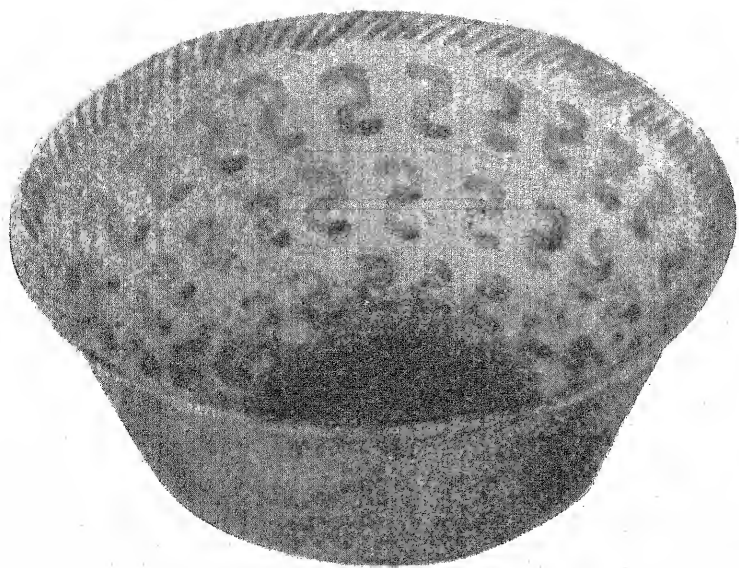


Plate XX.—Early Hohokam bowl.

Number 8170 in the Arizona State Museum. Diameter $7\frac{7}{8}$ inches,
depth $2\frac{7}{8}$ inches.

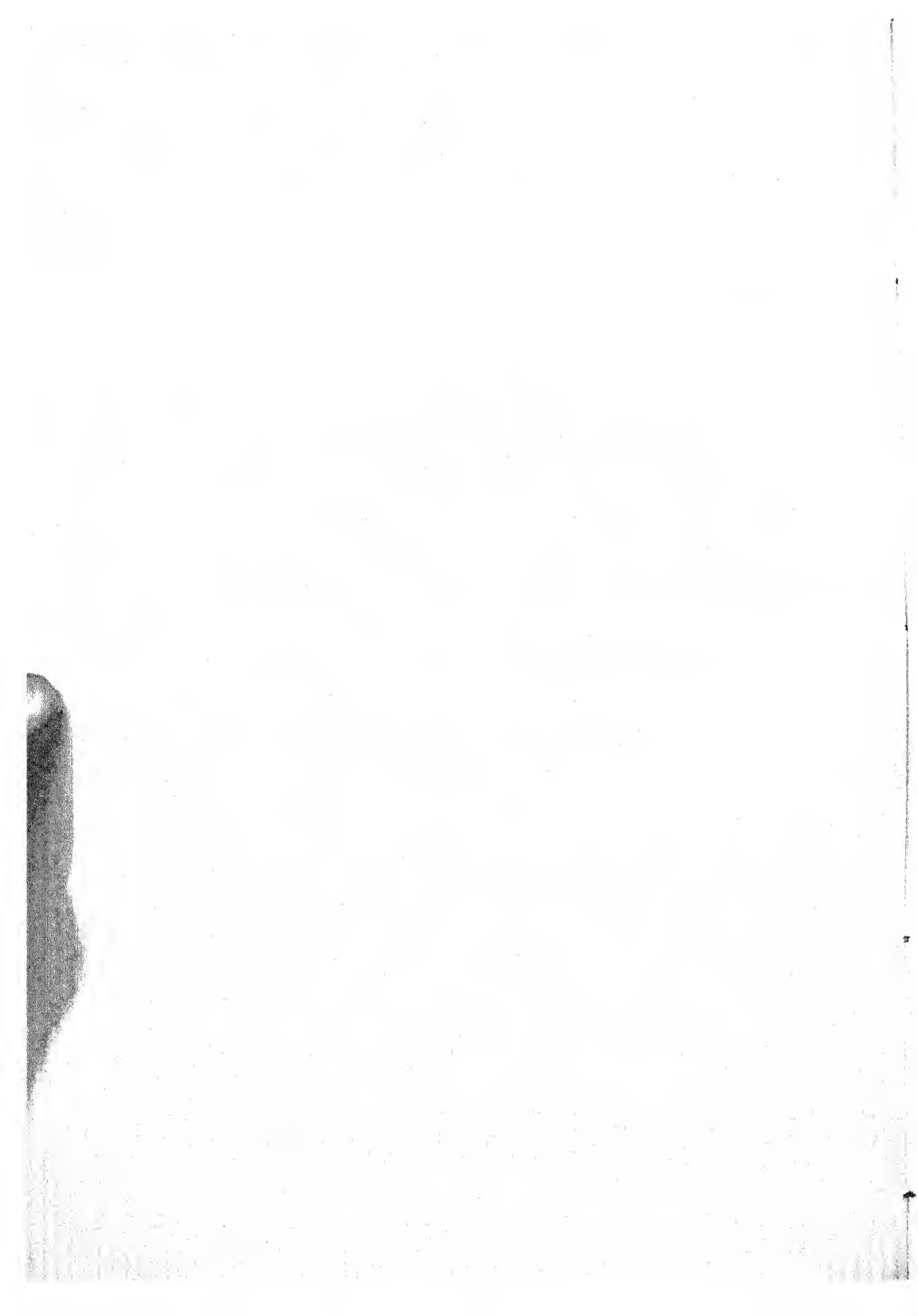




Plate XXI.—Late Hohokam bowl.

Number 14771 in the Arizona State Museum. Red-on-Buff bowl with smudged and burnished interior found at Bylas in 1926 by the University of Arizona expedition. Diameter $7\frac{7}{8}$ inches, depth $4\frac{3}{8}$ inches.



Plate XXII.—A Little Colorado olla.

Black-on-White of Tularosa type. Found at Fort Apache by the University of Arizona expedition of 1932. Diameter $19\frac{1}{2}$ inches, height $14\frac{1}{2}$ inches.

are also the corn symbol, the checkerboard, and the triangular water symbol. These motives are arranged in zones around ollas and bottles in a rather characteristic way. An interesting and different use is also made of the crosshatched background, the resulting pattern being more elaborate than the conventional checkerboard.

At some time during the Late Pueblo period a different influence, or a new idea which may perhaps have originated in the district, came into the Little Colorado area with driving force. This new style of Black-on-White pottery, called "Tularosa," may have come to the Little Colorado potters from the Upper Gila drainage to the southeast, and, if so, it was wholeheartedly adopted by them. It seems, however, at least equally possible that this new style is a local Little

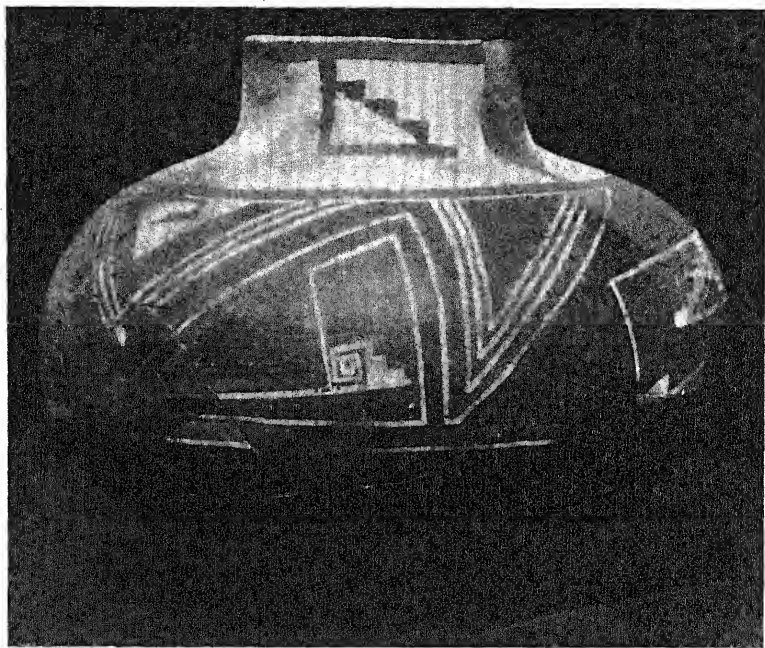


Plate XXIII.—A Four Mile olla.

Number 6293 in the Arizona State Museum. Found by Mr. Haury, National Geographic expedition 1927. Diameter $11\frac{1}{2}$ inches, height $9\frac{1}{2}$ inches.

Colorado development and that it was from this center that the type spread, rather than from the Upper Gila area. The essential characteristic of this new development in design is the balancing of solid black and hatched elements, interlocking stepped figures and large scrolls being particularly common. An olla of Tularosa type is shown on Plate XXII, and a Four Mile olla, one of its possible Polychrome descendants, on Plate XXIII. By the time this new idea was well established the Little Colorado potters were ready to develop another invention of their own, the Little Colorado Polychrome, a type which proved to be one of the most beautiful of all the types designed by the Indian potters.

BLACK-ON-RED

The first step in this direction had been taken when red ware was discovered. Black-on-Red bowls were being made even when Black-on-White pottery predominated, though it seems as if by the time the new idea arrived the Black-on-Red may have begun to supplant the Black-on-White. The large scroll and the balanced solid black and hatched elements were used on this red ware even more commonly than were the patterns inherited from Chaco canyon.

LITTLE COLORADO POLYCHROMES

St. Johns Type

From this Black-on-Red ware this new type was created by painting a pattern in clear, brilliant, permanent white on the outside of the bowl. This is a geometric pattern of broad straight lines in angular patterns, or of scrolls. A bowl thus decorated on the exterior is far handsomer than the Black-on-Red bowl without such decoration.

The variation in the color of these red bowls is very great, changing from red-orange to a true deep red. At times this red has a violet tinge but it is never so markedly purple as is the pottery from Cholula in Mexico, which must have been in use about this time.

The types of decoration on these bowls are almost as varied as the colors of the bowls themselves, though the influence of the Tularosa type predominates (that is the balanced solid and hatched scrolls, triangles, and stepped figures). The more usual arrangement of the pattern within the bowl seems to be in a zone, leaving an undecorated circular area in the bottom. The pattern frequently extends from this central circle to the rim of the bowl, though on many pieces border lines of some kind encircle both rim and central space. A few bowls are divided into four fields, as are those of the Kayenta region, and some few have negative patterns. According to Dr. Douglass' system of tree-ring dating, this type of pottery lasted until about 1300, when a variation in type took place.

Pinedale Polychrome

This new style predominated for about a hundred years. It is still a Black-on-Red in its general effect, the changes being mainly in the decoration on the outside of the bowls. The broad white lines on the exterior of the bowls of the St. Johns type were gradually replaced by single motives in black outlined in white, or by separate panels also outlined in white. This developed into a continuous band divided into panels in each of which there is a pattern in black and white. The design on the interior is painted in black on red and it is very similar to the previous type. If there is any change, it seems to be in the direction of bolder and, at times, asymmetric patterns in which a large scroll is a noticeable feature. The range of color of the red slip is still from a red-orange to a red tinged with purple.

Four Mile Polychrome

About 1400 a new idea occurred to some potter, and this changed the appearance of the Little Colorado Polychrome ware sufficiently for it to need a new name. This "Four Mile" Polychrome is often distinguished from the others by the white lines which outline the designs on the interiors of the bowls. When this is not done the character of the pattern on the exterior alone serves as a means of identification. This consists of a continuous band enclosed by two broad black bands outlined in white. Between these lines is a running pattern in white, which is often of flags or of flagged triangles. The necks of ollas are also very characteristic of this style. They are painted white with a design in black composed of large repeated units, crosses, broad lines, or stepped figures, such as are found on ollas of "Roosevelt" type. The designs on the interiors of bowls are similar to those on the Pinedale bowls; that is, balanced solid black and hatched figures, and giant scrolls either balanced or asymmetric. These patterns cover the entire interior of the bowl.

Jeddito Yellow

Along with these Polychrome wares, another type, equally characteristic of the Little Colorado area, had been developing. This is the Jadito, or Jeddito Yellow, a brown on orange in its early stages, and later a brown on yellow. This ware first appeared before 1300. It is distinguished from the Black-on-Red ware of the same period by its color which is a true orange instead of a red-orange. By 1300 the paste had become more definitely yellow, a dull, soft yellow, which is at times almost a buff. The finish is a smooth and almost slippery polish, which is not unlike that of the yellow Minyan ware of prehistoric Greece. Bowls are decorated on the interior with geometric patterns in brown. The character and distribution of the patterns seem to follow closely those of the contemporary Polychrome from 1300 to 1400.

Sikyatki Polychrome

From this fine Jeddito Yellow ware a new type was evolved by adding a reddish brown to the blackish brown already in use. This new type is named from the type village of Sikyatki. A shallower bowl with a new curve at the rim is characteristic as is also the type of decoration which is now predominantly zoomorphic rather than geometric. A large bird, conventionalized, or more or less realistic, sweeps across the field, or there may be a row or a group of human figures; or a hand from which a finger or two has been sacrificed; or an almost entirely geometric pattern such as had been in use for years. The paint is not put on as smoothly as heretofore, giving a shaded effect which may, or may not, have been intentional. The pattern is also surrounded by a halo of orange where the brownish paint has "run." Another variation in design is the all-over decoration in spatter work. To produce this effect the potter spatters paint with a brush over such parts of the bowl as are to be so decorated, the rest of the bowl having been covered.

This type of ware has been revived by the modern Hopi potters, not that they are copying it exactly, but rather that they are using it as the basis and inspiration of their present day design.

THE POTTERY OF THE UPPER GILA

BLACK-ON-WHITE (TULAROSA)

The black and white pottery of this area, which is so like the Little Colorado wares, is that which is known as "Tularosa" from the type site on the river of that name. This type of pottery belongs almost entirely to the Late Pueblo period. Very little earlier pottery has been found in this region, and this is described as being of a generalized Chaco canyon type.²⁰ This very distinctive ware thus seems to be a late comer into the region of the Upper Gila and the Upper Salt. A near neighbor of somewhat similar character is the Chupadero ware of the Rio Grande. There is also much similarity between the designs on the Tularosa ware and the geometric designs found on Mimbres pottery.

The striking Tularosa patterns are made up of relatively few elements. These are: large and boldly drawn interlocked scrolls, one curve of solid black and the other hatched; balanced black and hatched triangular figures and serrated lines; and balanced solid and hatched interlocking stepped patterns. There is little variation from these figures. (See Plate II.) Another characteristic, however, by which this ware is easily recognized is the animal handle on the equally typical globular pitcher. All these characteristics are so like those on Little Colorado Black-on-White that an origin in that district may be indicated.

UPPER GILA BLACK-ON-RED

Though this Tularosa pottery seems to have few antecedents in its immediate vicinity, it does seem to have some legitimate successors. One of these is a certain type of Black-on-Red which is not unlike that of the Little Colorado, and the other is the Early Gila Polychrome. The Black-on-Red is found extensively on bowls and ollas. The ollas which came from Gila Bank Ruin contained ashes and bones, the bowls serving as covers to the ollas. These vessels are decorated with the triangular and stepped figures, balanced solid and hatched, which are so typical of the Black-on-White pot-

²⁰Hough, Walter, *Antiquities of the Upper Gila and Salt Rivers*, 1907.

tery. For some reason the scroll is not commonly found in the Upper Gila region on the Black-on-Red, whereas in the Little Colorado district it was very popular on both red and Polychrome wares. This red ware is of a rather light red (of a more or less dull orange tone), which serves to distinguish it to some extent from the brighter orange and the deeper red of the Little Colorado area. In some cases, however, the difference in color of the wares of the two areas is slight, or even nonexistent, and the patterns are also very much alike.

EARLY GILA POLYCHROME

The same type of decoration was carried over from the Black-on-Red into the early Gila Polychrome. Ollas and bowls of this type, as well as the Black-on-Red, were found at Gila Bank Ruin, and the patterns on the two types were



Figure 6.—Early Gila Polychrome olla.

almost identical. An Early Gila Polychrome bowl has on the interior a design in black on a creamy white. The exterior is undecorated, and is somewhat orange in tone. The arrangement of the design within the bowl varies considerably. Sometimes there is a zonal pattern which extends from the rim to an open space in the bottom of the bowl, with no framing bands or lines, or, encircling the rim on the inside, there may be a broad black line with a gate in it for the exit of evil. The design may also be arranged in four fields around an open central square, or it may cover the entire interior. The designs consist largely of balanced solid and hatched motives. Longitudinal hatching, exquisitely done, is very frequently used; and on this as a background, interlocking stepped figures are occasionally found. The designs are in the main rectilinear, though the interlocking curved hooks on rows of triangles give the effect of a scroll. Symmetrical shapes, fine finish, and accurate brushwork are typical of this ware.

THE POTTERY OF THE MIDDLE GILA (HOHOKAM)

The pottery of this area reveals in its patterns quite as complicated a situation as was found in the Little Colorado drainage. Perhaps the situation is even more difficult, since one very large group, seemingly the largest and most important of all, has not yet been satisfactorily accounted for. This group is the Hohokam people who made the Red-on-Buff pottery. Though these people were agriculturists, built large community houses and villages, and made pottery as distinctly Southwestern Indian in type as any other in the Southwest, they are sufficiently different in some of their traits to be, perhaps, a different group of people from the northern or Pueblo Indians. In their pottery one great difference is in the method of manufacture, since they more frequently use the "paddle and anvil" rather than the coiled method which is more common to other pottery makers of the Southwest. Even these others, however, frequently model a small bowl out of a ball of clay, instead of coiling it.

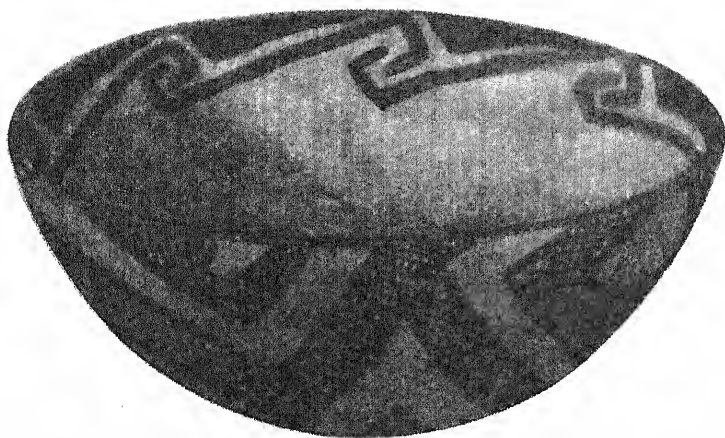


Plate XXIV.—Late Hohokam bowl.

Red-on-Buff exterior, red on gray interior. Found at Martínez Hill Ruin near Tucson by the University of Arizona expedition of 1931 and now in the Arizona State Museum. Diameter $8\frac{1}{2}$ inches, depth $3\frac{1}{2}$ inches.





Plate XXV.—Middle Gila Black-on-Red.

Found at University Ruin near Tucson by the University of Arizona expedition of 1933, and now in the Arizona State Museum. Height $5\frac{1}{2}$ inches, diameter $6\frac{3}{4}$ inches, and opening $4\frac{5}{8}$ inches.





Plate XXVI.—Tucson Polychrome olla.

Number 5580 in the Arizona State Museum. Found at University Ruin near Tucson by the University of Arizona expedition of 1932. Diameter $7\frac{1}{8}$ inches, height $6\frac{1}{2}$ inches, opening $4\frac{5}{8}$ inches.

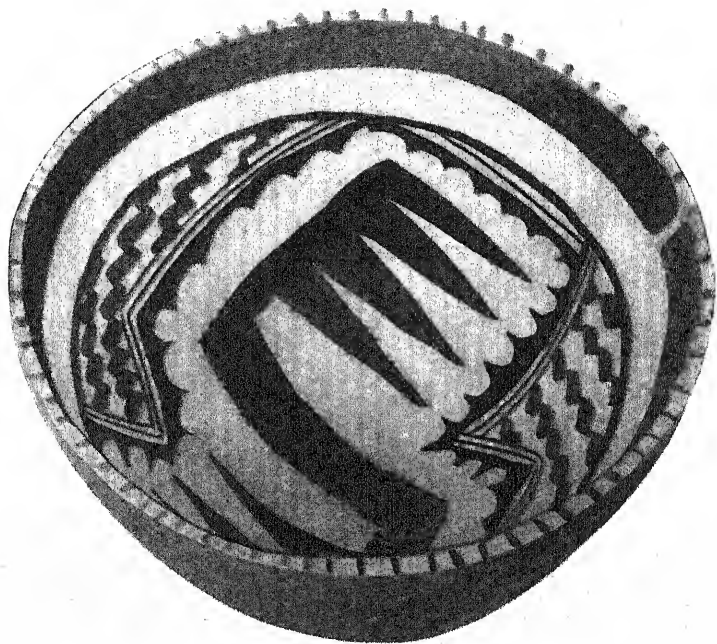


Plate XXVII.—A Late Gila Polychrome bowl.
Museum number 19302. Found at Hill Top Ruin near Miami, Arizona,
and presented to the Museum by Dr. Cron of Miami. Diameter $6\frac{3}{4}$
inches, depth $5\frac{1}{2}$ inches.

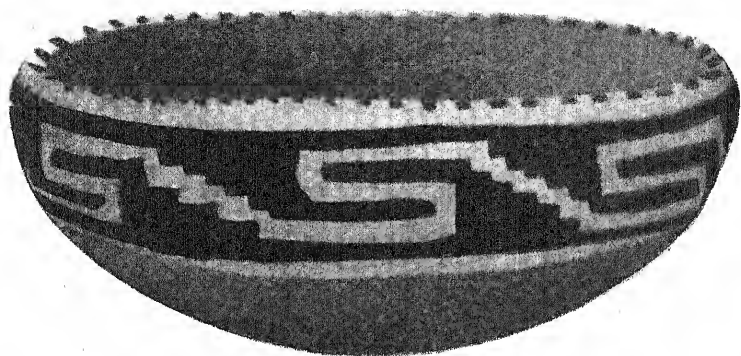


Plate XXVIII.—Late Gila Polychrome bowl.

Number 8573 in the Arizona State Museum. Found at Kinishba Ruin near Fort Apache by the University of Arizona expedition, 1932. Diameter to edge of rim $6\frac{3}{4}$ inches, greatest diameter $7\frac{1}{2}$ inches, depth $3\frac{1}{4}$ inches.



Plate XXIX.—A Late Gila Polychrome olla.

Number 17345 in the Arizona State Museum. Found at Roosevelt lake.
Diameter 6 inches, height $5\frac{3}{4}$ inches, opening $3\frac{1}{8}$ inches.



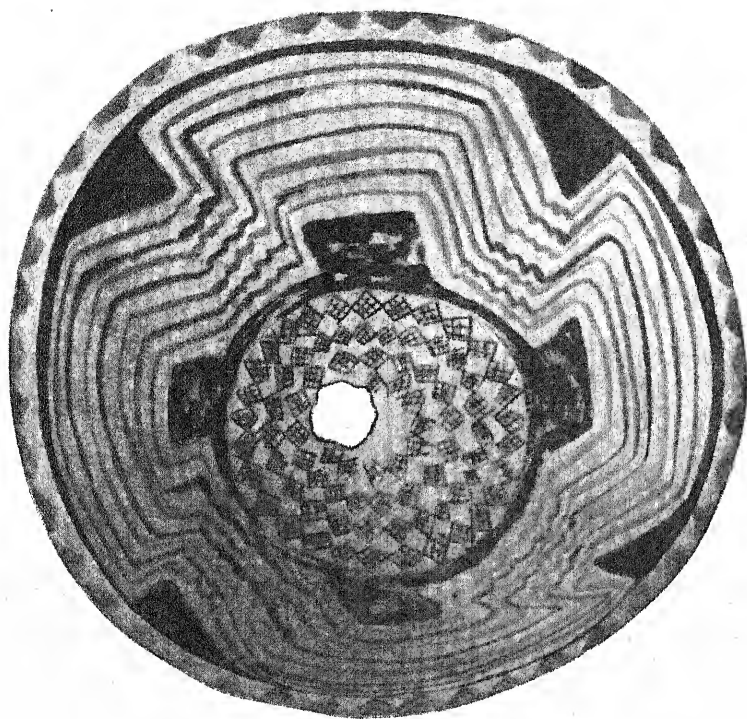


Plate XXX.—A Nogales Polychrome bowl.

Number 8513 in the Arizona State Museum. Diameter $11\frac{5}{8}$ inches,
depth $4\frac{1}{2}$ inches.





Plate XXXI.—A Chihuahua olla.

Found in a ruin near Casas Grandes, Mexico, and now in the Arizona State Museum. Approximate dimensions: diameter $7\frac{1}{8}$ inches, height $7\frac{1}{4}$ inches, opening $4\frac{1}{2}$ inches.

EARLY RED-ON-BUFF (HOHOKAM)

The earliest phase of Hohokam pottery is very widely distributed, much more so than any of the later phases. The whole culture, pottery included, is a remarkably homogeneous one, showing almost identical characteristics in widely separated sites. Mr. Gladwin has tentatively located the limits of this culture on the north, east, and west. On the south Dr. Cummings has found this early type in Nogales and in sites along the San Pedro and Santa Cruz rivers, which facts suggest that perhaps this people drifted up from Northern Mexico by these two routes. This early Hohokam is a rather crude, but most effectively decorated type of pottery. The ground is a light buff, pinkish to gray in color, unslipped as a rule, and the design is in reds of all shades from red to a red-purple. Some of the shapes are unlike those of the northern tribes and are more like those found in Mexico; such are the tripod vessels, the incense burners, and the flaring bowls. In design the interlocked scroll to which is attached a long fringed triangle recalls the similar treatment of this motive in use from Mitla to Teotihuacán. Other patterns consist of various large elements repeated. These are sometimes arranged in four fields in the interior of a bowl or shallow plate, but quite as often birds, snakes, or crosses follow each other around and around from the center to the rim. On seed bowls and ollas a procession of birds, or bears (maybe), or even men, walk or dance. Though the variety of life forms is great, geometric motives are really more commonly used. These consist of parallel lines either straight or wavy, of zigzags, and simple meander, of solid triangles with fringed edges, of scrolls either curvilinear or rectilinear, and of concentric circles and large dots. This, though by no means a complete list, gives a fair idea of the type. The painting is boldly done, apparently with joy and freedom.

LATE HOHOKAM AND ITS SANTA CRUZ VARIANTS

Between the early and the late periods of this Red-on-Buff pottery, there is a decided change, not only in the shapes,

but also in the designs, geometric elements being used almost to the exclusion of life forms. The motives are smaller in size and the lines are finer. In fact the whole scheme of decoration shows the influence of other Late Pueblo types. It seems to have been inspired to some extent by the pottery of Kayenta, as the lightning zigzag between broad serrated lines and the longitudinal hatchings with one line bordered by dots are very common, as are also the flagged triangles, so popular in the Little Colorado area. The ground is often darker and redder at this time and may be slipped but not polished.

Another type of Red-on-Buff seems to be characteristic of the Santa Cruz valley. The ground color, unslipped, varies from a light grayish buff to a darker reddish tone. The pattern is made up of broad lines with interlocking hooks. Some of these lines are very broad and are filled with cross-hatching, others with interlocked scrolls, while others, not so wide, are plain, solid red. This type of design approximates to a certain extent the patterns used on the Black-on-Red of the Middle Gila and the Tucson Polychrome.

At about this same time a slipped and polished Red-on-Buff was also being made in this southern area. Bowls are most numerous, though ollas and pitchers have been found. The exterior of the bowl is frequently decorated with groups of parallel lines, the outer one bordered with dots (or short lines), or with long, narrow, sloping triangles, or else with fringed triangles and scrolls. The interior is smudged black and beautifully burnished (Plate XXI). Though the technique of these bowls is frequently somewhat careless, the impressionistic effect is pleasing. There are variations of this type of bowl, one of which has not only a decoration on the exterior but also a band around the rim on the interior in red on a gray ground which seems to be slightly smudged (Plate XXIV). Another bowl was smudged black after the pattern was painted on; this has darkened the red considerably. Sherds have been found on which the red resin is painted over the smudged black background. Some bowls and ollas have such large firing clouds that they are half Red-on-Buff and half Red-on-Black. A different effect is given

to these Red-on-Buff bowls by the addition of white lines and dots to the red pattern, which combination perhaps might be called a Hohokam polychrome.

A curious pitcher (Plate XXXII) has been found at the University Ruin near Tucson, which may possibly be one of the missing links between Black-on-White types and the Hohokam. The pitcher is gray and the pattern is in black. It is not, however, a Black-on-White pattern but on the contrary one that contains elements typical of the Red-on-Buff wares. Though the background of Red-on-Buff pieces is often burned or smudged gray, this does not seem to be the case



Plate XXXII.—A Black-on-Gray pot.

Number 6287 in the Arizona State Museum. Found at University Ruin near Tucson by the University of Arizona expedition of 1933. Long diameter $5\frac{7}{8}$ inches, short diameter $5\frac{3}{16}$ inches, height 5 inches, opening $3\frac{1}{8}$ inches.

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here, since the pattern is also gray. When a Red-on-Buff piece is burned a second time, as when the house burns down, the pattern still remains red.

Another uncommon Hohokam piece is a Black-on-Buff olla found at Martínez Hill Ruin. Except for the lack of red it suggests a Chihuahua pot in its color but is not of such a fine finish. The pattern is such as might be found on a Red-on-Buff olla of the late type. The later potters of this area did not keep so strictly to old customs and color schemes as had their sisters in earlier times.

The period of time during which this Hohokam culture existed has not yet been decided by the tree-ring method, but cross finds suggest that the early Red-on-Buff was contemporary with the Black-on-White of the Early Pueblo period, and that the type in its different stages existed all through the great period of Southwestern art. Mr. Woodward of the Los Angeles Museum found half a bowl of early Black-on-White of northern type at the Grewe Site and Dr. Cummings has found at Hayden the same juxtaposition of the two types of ware.

ROOSEVELT BLACK-ON-WHITE

While the Hohokam people were making themselves at home in the Gila valley, another group was settling itself in the valley of the Salt river. These people seem to have come from the northeast, bringing with them an early type of Black-on-White pottery, which developed into what is known as the Roosevelt type. This pottery went through the same stages as did the pottery to the north, the earlier pieces showing fine lines, dots, and triangles, followed by the broad lines and triangles. Later both the Kayenta negative patterns and the balanced solid and hatched elements were used. The Tularosa type of pattern, however, dominated to such an extent that Roosevelt pottery is frequently classed under that name. It does, however, have certain individualities of its own which makes typical pieces easy to recognize. The small globular pitchers (Plate XXXIII) though of Tularosa shape and decorated with a Tularosa pattern do not have the



Plate XXXIII.—Roosevelt Black-on-White.
Globular pitcher found in the Roosevelt district.

animal handles (except rarely), and they do have a characteristic decoration of broad lines or some simple figure on the neck. The zonal pattern around the body is bounded above and below by definite lines, whereas the Tularosa design frequently finishes in the form of a star. This detail shows only if one looks at the bottom of the pitcher or olla. This later phase of Roosevelt Black-on-White seems to be identical with the Little Colorado Black-on-White ware of the same period. The elements of design used may have come from several places: from Chaco canyon, perhaps through the medium of the Puerco river ware; from Kayenta, seemingly filtered through the Turkey Hill type; and



Plate XXXIV.—Bowl from Roosevelt district.

Diameter $6\frac{5}{8}$ inches, depth $3\frac{3}{8}$ inches.

from the Little Colorado where the Tularosa type was found. The Roosevelt potters welded all these borrowings into a very presentable Tularosa type of their own.

They had meantime not been neglecting the possibilities of the Black-on-Red ware and were, it would seem, ready to make some experiments. Apparently they first tried combining the two types in the same piece of pottery. There is, in the Hawley collection, in Miami, a pitcher with a Black-on-Red body and a Black-on-White neck. This is not a pleasing piece but is an interesting experiment in the combination of the two types. At last they hit upon a better combination at about the same time apparently as did the Little Colorado and Upper Gila areas. This very satisfactory solution of the problem produced the beautiful Early Gila Polychrome which was briefly discussed under the Upper Gila types and illustrated in Plate XIX. This hand-

some ware is found extensively in the eastern and northern parts of the Middle Gila area where there has been contact with the Upper Gila and the Little Colorado, in fact with the Tularosa.

MIDDLE GILA BLACK-ON-RED

During the time when the Early Gila Polychrome had been developing in the north and east, other types of Polychrome were in process of evolution in the south. The people in the main Gila river drainage, perhaps the Hohokam themselves, had not been idle, but had produced a Black-on-Red ware unlike that found along the eastern border of the area where the influence of the Upper Gila types was so strongly felt. This ware is of a deeper, richer red than are the wares of the Upper Gila and it is also very different in its decoration. Instead of the balanced solid and hatched patterns, these southern Middle Gila potters used only a very broad line combined with stepped and triangular figures of various kinds. This type of pattern strongly resembles the decoration on the Red-on-Buff ware of this region at this time. A few jars and a number of sherds have been found at Martínez Hill Ruin and at University Ruin near Tucson. From these small numbers it is perhaps to be inferred that this phase of pottery decoration did not last long, but was soon merged into the type of Late Gila Polychrome known as Tucson Polychrome.

TUCSON POLYCHROME

The only difference between this Polychrome and the Black-on-Red is that the broad black lines are outlined in white. Thus, in many cases, it is difficult to be sure of the type of a given piece, since the white lines are often very faint and are frequently wholly obliterated. It is possible even that the pieces of Gila red ware chosen for illustration may after all be Polychrome pots. There is, however, one detail which may serve to differentiate the Black-on-Red from the Polychrome pots even when the white is entirely gone and that is the fact that the bottom of the Polychrome pot is sometimes left of the natural clay color below the lower border line of the design.

LATE GILA POLYCHROME

This, after the Red-on-Buff, is perhaps the most typical decorated ware of the Middle Gila area. At Casa Grande and other sites west of Tucson, this Polychrome ware seems directly to overlie the Red-on-Buff. Indeed, it seems to be only in the eastern and northern parts of the area that the early type of Gila Polychrome has been shown by stratigraphic tests to be directly under the later type, and even here, in some sites the two wares seem to have been found on the same level.

The difference between these two types of Polychromes is that of conservatism and impressionism in art. The excellent brushwork of the early Polychrome shows great care in its execution, strongly resembling, indeed, both the Mimbres and the best of the Tularosa ware in this particular. The patterns used, though beautiful in proportion and arrangement, are of a very conservative geometric type. As a great contrast to this ware comes the late type with large bold impressionistic patterns splashed on with haste and careless enthusiasm. Both spirit and execution call to mind the work of the early Hohokam potter, though by this time the elements used are largely those from the north. Common elements in use are: the bird wing; the curved or rectilinear scroll with its triangular tail ornamented with a picot or sawtooth edge; the serrated line which was so commonly used on the early Kayenta Polychrome; the broad line with its opening for the exit of evil; the stepped figure which is a cloud symbol to the Hopi; the corn symbol; and all types of hatching, very carelessly done, with perhaps a more frequent use of crosshatching than of the others. Black is used boldly and in large masses. The field of the design is frequently divided into two parts with the pattern reversed on the opposite side, reflecting it as in a mirror. The fourfold division also continued in use and asymmetric designs are found which recall the patterns on the Polychrome wares of the Little Colorado area. The color of the ground is a deep cream rather than a white, indeed it is almost *café au lait*. For some reason this slip shows innumerable fine

crackles. The black is a good clear black. The red slip on the outside is slightly pinkish in tone though there is considerable variation in color.

This popular style seems to have lasted for a long time and to have been the one in common use all over the Middle Gila district. As might be expected there are a number of local variations. One type is called Casa Grande Polychrome by those in charge of Casa Grande, even though it is as true to type as that which comes from Fort Apache (Plate XXVIII), and from the Roosevelt district, and is not nearly so individual as the queer gaudy bowl from Christmas.

Indeed, there seem to be two types of this Late Gila Polychrome, which is brought out more clearly at Casa Grande than elsewhere, since the excavators report a distinct break between the two. This second type makes use of red as an integral part of the pattern (Plate XXIX).

NOGALES POLYCHROME

This type of Polychrome shows an even closer relationship to the Hohokam pottery than does the Late Gila Polychrome. The bowl illustrated has a reddish exterior and a creamy white slip on the interior. The pattern, in red and purple, is very similar to one used on Red-on-Buff bowls, and the color of the paint is also very similar to the purplish tone used on the early Red-on-Buff found in Nogales, in the same excavation. With these pieces was found a seed bowl of brown paste with an interlocked scroll painted in the same purple (or red-purple) color.

CULTURE AREAS IN NEW MEXICO AND IN MEXICO

There are three culture areas in the Southwest which are so intimately connected with the pottery of Arizona that they cannot be entirely left out of this discussion. These are the Rio Grande, the Chihuahua, and the Mimbres districts.

In the Rio Grande are the Zuñi people who seem to be so closely connected with the Hopi that the Little Colorado is probably ancestral to both of them, though this does not particularly concern the pottery under consideration. There

are, however, two prehistoric wares from this region which show some connection with the Black-on-White pottery of Arizona. The sherds from Forked Lightning suggest contact with the north, while the Chupadero ware more closely resembles the Tularosa and the Mimbres.

MIMBRES POTTERY

The Mimbres pottery from southern New Mexico is close to that of the Upper Gila region both in space and in time. That they resemble each other closely cannot be denied since both make use of solid black and hatched elements in much the same way. Indeed, it is sometimes difficult to distinguish between the two. However, few Mimbres sherds have so far been reported from the Tularosa district, though Tularosa sherds were found in the Swarts Ruin in the Mimbres area. These, as well as the Chupadero sherds, were found with the later Mimbres ware. Perhaps Mimbres ware is ancestral to both these types, which would account for the strong family resemblance. Very superior technique and an unusually great number of zoomorphic motives characterize this ware. In color it is usually black on white though the white has often turned to a deep cream color and the black to a reddish brown from too intense firing. Mimbres Polychrome is not unlike the Black-on-White except for the addition of a yellowish buff color in certain areas of the design.

CHIHUAHUA WARE

Later than the Mimbres ware and about contemporary with the Late Gila Polychrome is the handsome pottery from Chihuahua. This is a Polychrome ware with the pattern in red and blue-black on a buff ground. In the designs longitudinal hatching and the balanced triangular and stepped elements suggest the Mimbres ware, only in this case the balanced figures are in black and red on buff instead of being black and hatched on white. Another link is the excellent technique. The buff ground is often of much the same color as the ground in early Red-on-Buff; even the red is similar, so that when a sherd shows only

red lines it would be easy to mistake it for Red-on-Buff, if it were not for the better polish of the Chihuahua sherds. Though this pottery does not resemble the Late Gila Polychrome in its decoration, it is possible to compare the effigy vases of the two styles since both made ducks, and also human effigy vases, which are very much alike in shape. This Chihuahua pottery is like that of the Southwest in its pattern elements but it is unlike it in the use of red areas to balance black ones, and in the use of one element, the "leaf" motive.

POTTERY PATTERNS AND CONCLUSIONS THEREFROM

On the chart, Comparative Study of Design Elements, fifty elements of design used by the prehistoric Indians of the Southwest are illustrated. Since every system of grouping seemed in some way unsatisfactory, this simple one was decided upon. The elements of design are placed under the following headings: dots; lines; hatchings; triangles and stepped figures; meanders and scrolls; bird wings; and life forms. The names used to describe the individual units are:

DOTS:

1. Dots used to fill areas.
2. Dots used to border lines or triangles.
3. The corn symbol, a dot in a rectangle or circle.

LINES:

4. Fine lines used to outline solid figures.
5. Broad lines.
6. Very broad lines outlined in black or color.
7. Wavy lines.
8. Zigzag lines.
9. Fringed lines and ticked edges.
10. Groups of lines in a given area.
11. Picot edge, sometimes called a sawtooth edge.

HATCHED FIGURES:

12. Longitudinal hatching.
13. Diagonal hatching.
14. Crosshatching.
15. Diagonal crosshatching.
16. Checkerboard; this also may be diagonal.

TRIANGLES AND STEPPED FIGURES:

17. Long, narrow, slanting triangles bordering a line.
18. Right angle and isosceles triangles bordering a line or single.
19. Lightning zigzag between rows of triangles of solid black.
20. Same white line between solid and hatched triangles.
21. Border of white rectangles (points of triangles meet).
22. Hour glass, butterfly, or double triangle.
23. Solid and hatched chevrons.
24. Triangle with rectangular hook.
25. Triangle with double (or triple) rectangular hook.
26. Triangle with stepped hook.
27. Triangle with curved hook.
28. Stepped triangle.
29. Interlocked stepped figure.
30. Stepped line.
31. Cloud symbol, stepped.

MEANDERS AND SCROLLS:

32. Simple meander, of which there are other forms.
33. Triangular water symbol.
34. Fringed rectangular interlocking figure (rectilinear scroll).
35. Rectilinear scroll bordered with dots.
36. Interlocked rectilinear scroll.
37. Rectilinear scroll and triangle with stepped, fringed, dotted, or picot edge.
38. One form of cross.
39. Scroll, running or interlocked.
40. Interlocked scroll with wing.
41. Winged scroll.
42. Giant scroll, balanced and hatched units.
43. Broad circular line with gate for exit of evil (life-line).

BIRD WING AND LIFE FORMS:

44. Curved wing.
45. Rectilinear wing.
46. Triangular wing.
47. Bird.
48. Animal: dog, bear, goat, fish, etc.
49. Man, either whole or in part.
50. Snake.

This chart was made after a study of 220 pieces of pottery in the Arizona State Museum (except for five of the Mimbres bowls which came from another collection). Ten

COMPARATIVE STUDY OF DESIGN ELEMENTS

	DOTS			LINES								HATCHINGS				TRIANGLES AND STEPPED FIGURES														SCROLLS AND CIRCLES												WINGS		LIFE FORMS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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pieces of pottery of each one of the twenty-two different types were examined, and the different figures used in the design listed and counted. This is, of course, a very small number of pots from which to draw any very definite conclusions. The study of Indian pottery must, however, begin somewhere and these two hundred or more pieces in the Arizona State Museum serve as the starting point. Certain resemblances which are indicated by this chart will have to be proved or disproved by further study. It is, indeed, fully realized that impressions based on the study of this small group may, or may not, be facts.

In the plates an attempt has been made to illustrate a piece of pottery typical in design, shape, and color of its period and area; although in one illustration only, it is almost impossible to convey an adequate idea of local peculiarities, and bring out at all clearly in what essentials one type differs from another, since the grouping of the units of design used makes up a design complex which is capable of great variation.

With this candle lighting the path, the following temporary conclusions are suggested:

On these 220 pieces of pottery the 50 different elements of design were used 705 times in all. Six hundred and seventy of these units were geometric; and thirty-four were life forms. Of the geometric figures only thirty-three were made up of curves, unless dots be included, which brings the number up to ninety-five. Even a casual observation of Indian pottery would lead to this same conclusion, namely, that straight lines and triangles are more frequently used than curved lines, and that life forms are rare except in certain localities.

Some of these units of design are found in almost every area, and indeed in almost every style. These most commonly used units are: narrow and broad lines, triangles, and stepped figures. Of the remaining motives some are used in certain localities and not in others, which makes the separation of local types fairly easy, though there are always some combinations which are a puzzle. In such cases

it is necessary to depend on paste, color, and shape for identification.

The combination of these different units, as well as the way in which single units may be arranged to make up an all over pattern, differs very much in the different areas. Such, for instance, is the arrangement in four fields so characteristic of the Kayenta region, or the zonal patterns found at Mesa Verde, or the large repeated units so common in early Red-on-Buff. Each sub-area of the Southwest, and sometimes it seems as if each village, developed its own individual type of pottery. Though these Indians stayed at home enough to work out their own ideas, they also travelled about enough, and probably also intermarried enough, to have a certain amount of influence on each other's pottery patterns.

Though it is more often the case that the different groups are set off from each other by the way in which they group the various elements of their designs, rather than by the use of one single unit, it is none the less true that certain groups are to be distinguished from others by the frequent use of one motive alone. Thus, the use of the great scroll, composed of balanced and hatched parts, sets off the Tularosa Black-on-White and the Little Colorado Polychromes from all other groups; and the so-called life line is found more frequently in the Late Gila Polychrome than elsewhere (except in Hopi or Zuñi). The use of life forms also distinguishes some groups from all others. Thus, the realistic figures of animals and men which the early Hohokam drew so frequently, and with such careless freedom, are as unlike the carefully executed and somewhat formal renderings of animal forms by the Mimbres people, as these figures are unlike the conventionalized life symbols of the Sikyatki type. Certain units of design occur in groups which do not seem to be very closely related to each other; but these patterns may be links in a chain of contacts. For instance, a frequent use of the hooked triangle, the one with a single hook, is found in the Kayenta pottery of the Late Pueblo period, in the late Hohokam, and in the still later Chihuahua. The serrated black lines used in

such a way as to leave a zigzag line between them are still another link between the late Kayenta and the Hohokam of the same period. Scrolls with triangular tails with fringed, dotted, scalloped, or picot edge, are found in late Kayenta, in the late Hohokam, and in Late Gila Polychrome.

Another series of patterns links another group together. The broad serrated lines, solid black and hatched balancing, are used in Upper Gila ware (including the Black-on-Red and the Early Gila Polychrome), in the Little Colorado Black-on-White, in the Polychrome wares from the Little Colorado district, in the Mimbres, and in the Chihuahua. In the Chihuahua ware, however, the balance is between black and red rather than between black and hatched elements.

In tracing the frequency of the use of the different units of design, and in looking for similarities in the combination and general arrangement of such units to make up the entire pattern, it would seem that there are two areas extending from north to south in the Southwest in which the designs used seem to be related. One of these areas includes the Mimbres and Chupadero wares just over the border in New Mexico, the Upper Gila wares (Tularosa, Black-on-Red, and Early Gila Polychrome), the Black-on-White and Polychrome wares of the Little Colorado, the Roosevelt pottery, and, strange to say, the Mesa Verde pottery in Colorado. The other area in which the designs on the pottery seem to be to some extent homogeneous includes the Kayenta region, and possibly that of Chaco canyon; the Hohokam district of southern Arizona; and the Late Gila Polychrome from the same area. This distribution of patterns suggests an infiltration from Mexico by two routes, that of the Rio Grande, which led to the Little Colorado area as well as to Chaco canyon and north, and that of the San Pedro and the Santa Cruz, which would lead to the central part of Arizona, and influence not only the early Red-on-Buff, but also both the late Red-on-Buff and the Late Gila Polychrome, even though these two latter types did mix to some extent with the influences coming from the northern pueblos.

SYMBOLISM

This question is one which cannot be left out entirely from any discussion of Indian art. It is important in basketry and pottery as well as in the sacred sand paintings.

Even in Early Pueblo times there is some indication of symbolic meaning, though many of the patterns are such as came either from the technique of pottery or weaving. The idea that artistic representations are magical dates back some twenty-five or thirty thousand years, and the possibility of increase by magic is still a part of Indian belief. It is perhaps possible that the more elaborate system of symbolism came in with the Toltec influence, perhaps in the Eleventh or Twelfth Century, when rain magic became so noticeable a trait in the culture of the northern Indians. Perhaps Mexico had opened the eyes of the Southwest to "a new philosophy of coercive art."²¹ Then triangles came to symbolize rain clouds, as did also the piled up semi-circular figures so frequently used by the Hopi. Dots hanging from lines meant the dripping rain drops, or the gentle "she" rain, while the hatchings symbolized the "he" rain. The scroll, in all its variations, is the water symbol, as is the case with so many other peoples. Other figures represent mountains, or corn, or butterflies, or the whirling wind. There is also the very powerful plumed serpent which winds its zigzag way around so many Indian pots. It is thus very evident that the need of rain to water the crops dominates the symbolism of the Southwest.

SUMMARY AND CONCLUSION

In spite of a certain amount of evidence of contact with Mexico, the art of pottery making seems to have been, to all intents and purposes, invented, developed, and perfected in the Southwest with very little outside influence. In the San Juan area, in the Kayenta region as well as in Chaco canyon over the border in New Mexico, there is a remarkably complete record of the earliest experiments with unfired

²¹Spinden, H. J., *Indian Symbolism, Introduction to American Indian Art*, Santa Fe, 1932, p. 8.

pottery, of the first crude attempts at firing, of the first steps in decoration, and of continued and uninterrupted improvement thereafter.

The beautiful ware of the Kayenta region had considerable influence, spreading into the Little Colorado area as well as into that of the Hohokam people, whose work in turn may have influenced the Kayenta pottery. The other type of San Juan design which had come into being in Chaco canyon, reached the same destination by another route and both types were assimilated by the Little Colorado potters.

This Little Colorado area is a particularly interesting one in that it has kept on making pottery all through the ages of Indian pre-history, and it is still going on. It is tempting to consider this area as the homeland of the "Tularosa" type of pottery, because this seems to be the logical step between the earlier Black-on-White and the various Polychromes which came later. If the creation of this type can be assigned to this region, the whole history of its patterns seems much more coherent.

Each group in the Southwest seems to have developed its own individual type of pottery, which changed in color as well as in design from one period to another without losing its individuality. The urge to create new types seems to have come from within quite as often as from without. In Early Pueblo times in particular, though there is evidence of trading with one another to a small extent, the influence of one type upon another is not marked. For instance, the early Black-on-White and the early Hohokam seemed to have little or no effect at all upon each other, though trade pieces have been found which prove that they were contemporary, and aware of the other's existence.

In the region around Tucson the Hohokam tried some very interesting experiments. One of these was the making of Black-on-Red pottery which they decorated with very broad lines, terminating in interlocking stepped figures. This type of design had already been tried out on a number of Red-on-Buff pieces, which would seem to indicate that the same potters were at work. Thus there appears to be

a sequence of types which connects the Red-on-Buff with the Tucson Polychrome (the local variety of Late Gila Polychrome).

The question of the relation of Early and Late Gila Polychromes to each other is an interesting and puzzling one. They do not seem to be particularly closely related except in the neighborhood of Globe. In other places they seem to come from different antecedents, and did not develop one from the other. From Bylas to Gila Bank Ruin, and near the border of the eastern limit of the Middle Gila area, the Early Gila Polychrome looks as if it might possibly be a descendant of the Tularosa type, coming through the Upper Gila Black-on-Red. On the contrary, in the central part of the Middle Gila area the Late Gila Polychrome seems to be very closely connected with the Hohokam Red-on-Buff, lying as it does directly on top of it with no early type between.

Toward the end of the Late Pueblo period this Late Gila Polychrome reached its peak of development, at which time it was a very varied style and widely distributed in central and southern Arizona. These later potters made use of all known elements of design and combined them in many new ways. They produced some bizarre pots, of course, but they also made many very beautiful pieces.

Contemporary with this Polychrome, but apparently not related to it, was another eclectic ware, that of Chihuahua, a very beautiful ware, usually better finished and more carefully decorated than the Gila ware. The formal patterns and the relatively few units used contrast with the exuberant fancy shown in the Gila patterns with their multitude of different motives.

Fortunately this art of pottery making is not a lost art among the Indians of today. In the Hopi villages of Arizona and the Zuñi villages of New Mexico there are potters whose work equals in skill, and rivals in beauty, that of their great-great-grandmothers, and their more remote ancestors as well.

BIBLIOGRAPHY

Amsden, Monroe.

- 1928.—Archaeological reconnaissance in Sonora. Southwest Museum Papers, L. A., California.

Barret, S. A.

- 1905.—Basket designs of the Pomo Indians. *American Anthropologist*, n. s. vol. 7, pp. 648-653.

Bingham, Hiram.

- 1924.—Machu Picchu, Yale University Press.

Blegen, C. W.

- 1922.—Excavations in Greece (Zigourdes). *Art and Archaeology*, vols. 13, 14, pp. 209-216.

Boas, Franz.

- 1924.—Evolution or diffusion. *American Anthropologist*, n. s., vol. 26, p. 340.

- 1927.—Primitive art. Harvard University Press, Cambridge, Mass.

Breasted, J. H.

- 1932.—Mayan culture indigenous. *El Palacio*, vol. 32, nos. 17, 18, p. 243, May 4.

Carnegie Institution of Washington.

- 1931.—The Maya of Middle America. *News Service Bulletin*, vol. 2, nos. 17, 18, 19, 20.

- 1932.—Pottery discoveries in ancient Maya grave. *News Service Bulletin*, vol. 2, no. 36.

Carey, Henry A.

- 1931.—An analysis of the Northwestern Chihuahua culture. *American Anthropologist*, vol. 33, no. 3, pp. 361-374.

Colton, Harold S.

- 1932.—A survey of prehistoric sites in the region of Flagstaff, Arizona. Smithsonian Institution, Bureau of American Ethnology, *Bulletin* 104.

Chapman, Kenneth M.

- 1921.—What the potsherds tell. *Art and Archaeology*, vol. 11, pp. 39-44.

- 1922.—Life forms in Pueblo pottery decoration. *Art and Archaeology*, vol. 13, pp. 120-122.

- 1923.—Casas Grandes pottery. *Art and Archaeology*, vol. 16, pp. 25-34.

- 1927.—Post Spanish Pueblo pottery. *Art and Archaeology*, vol. 23, p. 24.

- 1928.—Bird forms in Zuñi pottery decoration. *El Palacio*, vol. 24, pp. 23-25.

Corpus Vasorum Antiquorum, Musée du Louvre.

Fascicule I and IV. Printed in Paris.

Cummings, Byron.

1915.—Kivas of the San Juan drainage. *American Anthropologist*, n. s., vol. 17, no. 2, pp. 272-282.

1920.—The national monuments of Arizona. *Art and Archaeology*, vol. 10, pp. 27-36.

1923.—The ruins of Cuicuilco. *National Geographic Magazine*, vol. 44, pp. 203-220.

1923.—Cuicuilco, the oldest temple discovered in North America. *Art and Archaeology*, vol. 16, July-August, pp. 51-58.

1926.—Ancient canals of the Casa Grande. *Progressive Arizona*, November, 1926.

1932.—Three types of culture in one pueblo. *El Palacio*, vol. 32, no. 9, p. 128, March 2.

1932-33.—Lecture notes—University of Arizona.

Cushing, Frank Hamilton.

1886.—A study of Pueblo pottery. 4th Annual Report, Bureau of American Ethnology.

Darton, N. H.

1925.—A Resumé of Arizona geology. *University of Arizona, Bulletin* 119.

Dixon, Roland B.

1928.—The building of cultures. Charles Scribner's Sons, New York.

Douglass, A. E.

1929.—The secret of the Southwest solved by talkative tree rings. *The National Geographic Magazine*, vol. 66, pp. 337-770.

Fewkes, J. Walter.

1898.—Archæological expedition to Arizona (Sikyatki). 17th Annual Report of the Bureau of American Ethnol., p. 519.

1904.—Two summers' work in Pueblo ruins (4 Mile, Chaves Pass). 22nd Annual Report of the Bureau of American Ethnology.

1911.—Preliminary report — Navajo National Mounment. *Bulletin* no. 50, Bureau of American Ethnology.

1911.—Antiquities of Mesa Verde national park. *Bulletin* no. 51, Bureau of American Ethnology.

1914.—Archæology of the Lower Mimbres valley, New Mexico. *Smithsonian Miscellaneous Collections*, vol. 63, no. 10.

1919.—Designs on prehistoric Hopi pottery. 33rd Annual Report of the Bureau of American Ethnology.

Ancient Zuffi pottery. *University of Arizona Library*, no. A 9791, F 45 c.

1923.—Additional designs on prehistoric Mimbres pottery. *Smithsonian Miscellaneous Collections*, vol. 76, no. 8.

1926.—Archæological field work in Arizona (Elden Pueblo). *Smithsonian Miscellaneous Collections*, vol. 78, no. 7.

1926.—An archæological collection from Youngs canyon near Flagstaff. *Smithsonian Institution*, no. 2833.

Figgins, J. D.

- 1931.—An additional discovery of the association of a Folsom artifact and fossil mammal remains. *Proceedings of the Colorado Museum of Natural History*.

Franchet, L.

- 1911.—*Ceramique primitive*, Librairie Paul Gauthier, 68 Rue Mazarine.

Gabel, Norman.

- 1932.—Martínez Hill Ruin. University of Arizona thesis.

Gamio, Manuel.

- 1922.—*La población del valle de Teotihuacán*. Published in Mexico.

- 1924.—The sequence of cultures in Mexico. *American Anthropologist*, n. s., vol. 26, p. 307.

- 1926.—Cultural evolution in Guatemala. *Art and Archaeology*, vol. 22, pp. 203-223.

Gidley, James W.

- 1927.—Evidence of early man in Florida. *Smithsonian Miscellaneous Collections*, vol. 78, no. 7.

Gifford, E. W.

- 1928.—Pottery making in the Southwest. University of California Publications, vol. 23, no. 8.

Gladwin, H. S.

- 1927.—Excavations at Casa Grande. *Southwest Museum Papers*, Los Angeles, Cal.

Goddard, Pliny Earle.

- 1931.—Pottery of the Southwestern Indians. Guide Leaflet no. 73 of the American Museum of Natural History.

Graham, David Crockett.

- 1932.—The ancient caves of Szechwan province, China. *Proceedings of the U. S. National Museum*, vol. 80, Article 16, pp. 1-13.

Guernsey, Samuel James.

- 1921.—Basket Maker caves of northeastern Arizona. *Papers of the Peabody Museum*, Cambridge, Mass.

- 1931.—Explorations in northeastern Arizona. *Papers of the Peabody Museum*, Cambridge, Mass.

Guthe, Carl E.

- 1925.—*Pueblo pottery making*. Yale University Press.

Haeberlin, Herman K.

- 1919.—Types of ceramic art in the valley of Mexico. *American Anthropologist*, n. s., vol. 21, p. 61.

Hanna, Murel W.

- 1931.—An archaeological review of Middle Gila culture. University of Arizona thesis.

Hargrave, L. C.

- 1932.—A guide to forty pottery types, Northern Arizona Society of Science and Art, Flagstaff, Arizona.

Harrington, M. R.

- 1930.—The mystery of Gypsum cave. *Scientific American*. July, p. 34.

Hartt, Charles Ford.

- 1875.—On the evolution of ornament. *Popular Science Monthly*.

Haury, Emil.

- 1932.—The age of lead glaze decorated pottery of the Southwest. *American Anthropologist*, n. s., vol. 34, July-Sept., pp. 418-426.
1931.—Recently dated Pueblo ruins in Arizona. *Smithsonian Miscellaneous Collections*, vol. 82, no. 11.
1932.—Roosevelt 9.6, a Hohokam site. *The Medallion, Globe, Arizona*.

Hawley, Florence.

- 1929.—Prehistoric pottery pigments in the Southwest. *American Anthropologist*, vol. 31, no. 4, pp. 731-754.
1930.—Prehistoric pottery and culture relations in the Middle Gila. *American Anthropologist*, vol. 32, no. 3, pp. 522-536.
1932.—The Bead Mountain pueblos of Southern Arizona. *Art and Archaeology*, vol. 33, no. 5, Sept.-Oct.

Hewett, Edgar L.

- 1904.—A general view of the archaeology of the Pueblo region. *Annual Report of the Smithsonian Institution*.
+ 1918.—The Pajaritan culture. *American Journal of Archaeology*, vol. 13, no. 3, p. 341.
1921.—The Chaco canyon and its ancient monuments. *Art and Archaeology*, vols. 11, 12, January, pp. 3-28.
+ 1930.—Ancient life in the American Southwest. Bobbs-Merrill Co.

Hodge, F. W.

- 1921.—Turquoise work of Hawikuh, New Mexico. Heye Foundation, New York, Leaflet no. 2.
X 1931-32.—Introduction to American Indian art. Exposition of Indian tribal arts, Santa Fe.

Holmes, William H.

- 1886.—Origin and development of form and ornament in ceramics. 4th Annual Report of the Bureau of American Ethnology.
Ancient pottery of the Mississippi valley. 4th Annual Report of the Bureau of American Ethnology.
Pottery of the ancient pueblos. 4th Annual Report of the Bureau of American Ethnology.
A study of the textile art in its relation to pottery. 6th Annual Report of the Bureau of American Ethnology.

Hooton, Earnest Albert.

- 1932.—Up from the ape. Macmillan Co.
1932.—The Indians of Pecos. Yale University Press.

Hough, Walter.

- 1901.—Archæological field work in northeastern Arizona. Report of the U. S. National Museum, pp. 279-358.
- 1907.—Antiquities of the Upper Gila and Salt River valleys. Bulletin no. 35 of the Bureau of American Ethnology.
- 1914.—Cultures of the ancient pueblos of the Upper Gila region. Bulletin 87 of the U. S. National Museum.
- 1917.—A revival of the ancient Hopi pottery art. American Anthropologist, vol. 17, pp. 322-323.
- 1928.—The lead glaze decorated pottery of the Pueblo region. American Anthropologist, n. s., vol. 30, p. 243.
- 1931.—Decorative designs on Elden Pueblo pottery, Flagstaff, Arizona. Proceedings of the U. S. National Museum, vol. 81, art. 7, pp. 1-11.
- 1932.—A cache of Basket Maker baskets from New Mexico. Proceedings of the U. S. National Museum, vol. 81, art. 7, pp. 1-3.

X/ Hrdlicka, Ales.

- 1923.—The origin and antiquity of the American Indian. Smithsonian Report, pp. 481-494.

Jeanson, J. A.

- 1923.—Excavations in the Chama valley, New Mexico. Bulletin 81, Bureau of American Ethnology.

Jenks, Albert Ernest.

- 1931.—The significance of mended bowls in the Mimbres Culture. El Palacio, vol. 31, nos. 10-11, p. 153.

Judd, Neil M.

- 1926.—Archæological observations north of the Rio Colorado. Bulletin 82 of the Bureau of American Ethnology.
- X 1927.—Investigation in Chaco canyon. Smithsonian Miscellaneous Collections, vol. 78, no. 7.

Kidder, Alfred Vincent.

- 1920.—Ruins of the Historic period in the San Juan, N. M. American Anthropologist, vol. 22, pp. 322-329.
- + 1924.—An introduction to the study of Southwestern archaeology. Yale University Press.
- 1926.—The trend of archæological research. Art and Archaeology, vols. 21, 22, pp. 223-224.
- 1932.—The pottery of Pecos. Yale University Press.

Kroeber, A. L.

- 1923.—Anthropology. Harcourt, Brace and Co.
- + 1926.—Culture stratifications in Peru. American Anthropologist, vol. 28, p. 331.
- 1927.—The Uhle collection from Chincha. University of Cal. Publications, vol. 21.
- + 1928.—Native culture of the Southwest. University of Cal. Publications, vol. 23, no. 9.

Leveret.

- 1930.—A paper on ancient man in Ecuador. Read before the National Academy of Sciences.

Liang, Ssu Yung.

- 1930.—New Stone Age pottery from the Prehistoric site at Hsi-yin Tsun, Shansi, China. *Memoirs of American Anthropology Assn.*, no. 37.

Lockwood, Frank C.

- 1932.—*Pioneer days in Arizona*. Macmillan Co.

Lumholtz, Karl.

- 1902.—*Unknown Mexico*. Chas. Scribner's Sons.

- 1909.—A remarkable ceremonial vessel from Cholula. *American Anthropologist*, vol. 11, pp. 199-201.

MacCurdy, George Grant.

- 1916.—The octopus motive in ancient Chiriquian art. *American Anthropologist*, vol. 18, pp. 366-383.

McGregor, J. C.

- 1929.—The cotton industry of the ancients. *Progressive Arizona*, vol. 8, no. 3, p. 13.

- 1931.—*Archaeology of the Little Colorado area*. University of Arizona thesis.

Marquina, Ignacio.

- 1928.—*Monumentos arqueológicos*. Published by the Mexican Government.

X Maudsley, A. P.

- 1928.—The discovery and conquest of Mexico. Translated from the Spanish of Bernal Díaz del Castillo, 1517-1521. George Routledge and Sons, London.

Mason, Otis T.

- 1904.—Aboriginal American basketry. *Annual Report of the U. S. National Museum*, pp. 185-548.

Medallion Series, The (Gladwin, H. S.).

- 1929.—The Red on Buff culture of the Gila basin. Privately printed for the Medallion, Globe, Ariz.

- 1929.—The Red on Buff culture of the Papaguería.

- 1930.—The western range of the Red on Buff culture.

- 1930.—An archaeological survey of the Verde valley.

- 1930.—A method for the designation of pottery types.

- 1931.—Some Southwestern pottery types.

Mera, H. P.

- 1931.—Chupadero Black on White. *Bulletin 1, Archaeological Survey, the Laboratory of Anthropology, Santa Fe*.

- 1932.—Wares ancestral to Tewa Polychrome. *Laboratory of Anthropology, Santa Fe*.

X Merwin, Raymond E. and Vallant, George C.

- 1932.—The ruins of Holmul, Guatemala. *Memoirs of the Peabody Museum, Cambridge, Mass.*

Morris, Earl H.

1915.—The excavation of a ruin near Aztec, N. M. *The American Anthropologist*, n. s., vol. 17, no. 4, p. 666.

1917.—The place of coiled ware in Southwestern pottery. *The American Anthropologist*, n. s., vol. 19, pp. 24-29.

1919.—Preliminary account of the antiquities of the region between the Manos and La Plata rivers in s. w. Colorado. *American Anthropologist*, vol. 22, pp. 285-288.

1925.—Exploring in the Canyon of Death. *National Geographic Magazine*, vol. 48, no. 3, pp. 263-300.

1927.—The beginnings of pottery making in the San Juan area. *Anthropological Papers, American Museum of Natural History*, vol. 28.

X 1931.—The Temple of the Warriors at Chichen Itza, Yucatan. *Carnegie Institution of Washington*.

Morss, Noel.

1927.—Archaeological explorations on the Middle Chinlee, 1925. *American Anthropological Memoirs*, no. 34.

1931.—Notes on the archaeology of the Kaibito and Rainbow plateaus in Arizona. *Papers of the Peabody Museum, Cambridge, Mass.*

X Morley, S. J.

1931.—Unearthing America's ancient history. *National Geographic Magazine*, vol. 60, pp. 99-126, July.

Nusbaum, Jesse L.

1922.—A Basket Maker cave in Kane County, Utah. *Heye Foundation, Notes and Monographs*, pp. 138-144.

Pepper, George H.

1902.—The ancient Basket Makers of southeastern Utah. *American Museum of Natural History. Supplement to American Museum Journal*, vol. 2, no. 4.

1905.—Ceremonial objects and ornaments from Pueblo Bonito. *American Anthropologist*, n. s., vol. 7, no. 2, p. 183.

1920.—Pueblo Bonito. *Anthropological Papers of the American Museum of Natural History*, vol. 27.

Prudden, T. Mitchell.

1918.—A further study of Small House Ruins in the San Juan watershed. *Memoirs of the American Anthropological Association*, vol. 5, p. 3.

Pinkley, Edna Townsley.

1926.—Casa Grande, the greatest Valley Pueblo. *Arizona Archaeological and Historical Society*.

87 Russell, Frank.

1908.—The Pima Indians. *26th Annual Report of the Bureau of American Ethnology*, pp. 17-389.

X/ Renaud, (Abel) Etienne Bernardeau.

1926.—Uncovering the First Americans. *Forum*, vol. 75, pp. 109-113.

1929.—Prehistoric female figurines. *Scientific Monthly*, vol. 28, pp. 507-512.

Roberts, Frank H. H., Jr.

1927.—A late Basket Maker village of the Southwest. *Explorations and Field Work of the Smithsonian Institution in 1927*.

1929.—Recent archaeological developments in the vicinity of El Paso, Texas. *Smithsonian Misc. Collections*, vol. 81, no. 7.

1929.—Shabik'eschee village. *Bulletin 92, Bureau of American Ethnology*.

1930.—Early Pueblo ruins in the Piedra district, Colorado. *Bulletin 96, Bureau of American Ethnology*.

X/ 1931.—The ruins of Kiatuthlanna, Arizona. *Bulletin 100, Bureau of American Ethnology*.

1932.—The village of the Great Kivas, New Mexico. *Bulletin 111, Bureau of American Ethnology*.

Sauer, Carl and Brand, Donald.

1920.—Pueblo sites in southeastern Arizona. *University of Cal. Publication in Geography*, vol. 3, no. 7.

Shetrone, H. C.

The Mound Builders. A. Appleton and Co.

Schmidt, Erich H.

1928.—Time relations of prehistoric pottery types in southern Arizona. *Anth. Papers of American Museum of Natural History*, vol. 30, part 5.

Spier, Leslie.

1918.—Notes on some Little Colorado ruins. *Anthropological Papers of the American Museum of Natural History*, vol. 18, part 4.

X/ Spinden, H. J.

1928.—Ancient civilizations of Mexico. *Anthropological Handbook Fund*, N. Y.

X/ 1932.—Fine art and the First Americans. *Introduction to American Indian art, exposition of Indian tribal arts, Santa Fe*.

1932.—Indian symbolism. *Introduction to American Indian art, exposition of Indian tribal arts, Santa Fe*.

Stallings, W. S.

1931.—El Paso Polychrome, *Bulletin no. 3, Laboratory of Anthropology, Santa Fe*.

1932.—Notes on the Pueblo culture in south central New Mexico. *American Anthropologist*, vol. 34, no. 1.

Stock, Chester.

1931.—Problems of antiquity presented by Gypsum cave, Nevada. *Scientific Monthly*, January.

Stevenson, James.

Collections of Southwestern pottery (Zuñi). A. R. 2, Bureau of American Ethnology.

Steward, Julian H.

1929.—Diffusion and independent invention. *American Anthropologist*, n. s., vol. 31.

Tozzer, Alfred M.

1907.—A comparative study of the Mayas and Lacandonas. *Archaeological Institute of America*.

Vaillant, George C.

1930.—Excavations at Zacatenco. *Anthropological Papers of the American Museum of Natural History*, vol. 32, part 1.

1931.—Excavations at Ticoman. *Anthropological Papers of the American Museum of Natural History*, vol. 32, part 2.

1932.—Stratigraphical research in Central Mexico. *Proceedings of the National Academy of Sciences*, vol. 18, no. 7, pp. 487-490.

1932.—Some resemblances in the ceramics of Central and North America. *The Medallion*, Globe, Arizona.

Valcanel, Louis E.

1932.—*Arte antiguo peruano*.
Revista del Museo Nacional, Lima.

Wilson, Mrs. L. L. W.

1918.—Hand sign or Avanu. *American Anthropologist*, vol. 20, pp. 311-313.

Wissler, Clark.

1917.—*The American Indian*. Oxford University Press.

Woodward, Arthur.

The Grewe site. *Los Angeles Museum, Occasional Papers*, 1.

MUSEUMS VISITED

Though all the illustrations in this paper were made from pottery in the Arizona State Museum in Tucson, it was the author's privilege to visit and study other collections, including:

The Los Angeles Museum, Los Angeles, California

The Museum of San Diego, California

The Museum at Casa Grande, Arizona

Gila Pueblo, Globe, Arizona

The Hawley Collection, Miami, Arizona

The Museum at Santa Fe, New Mexico

The Field Museum, Chicago, Illinois

The Museum of the Heye Foundation, New York

The Peabody Museum in Boston, Mass.

The Museum at Sieur de Mont Spring, Bar Harbor, Maine

